THE MARINE REVIEW

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What Halts Our Merchant Marine?

American Ship Yards Are Turning Out Vessels in Record-Breaking Volume But Sales to Foreigners Offset Most of the Gain

WIDELY circulated reports about the boom in ship building in American yards have led to a false conception by many persons of the real condition of the American merchant marine. Fortunately, the general indifference of a few years ago toward anything relating to a merchant marine has been replaced by a more active interest in this great question, but it is essential that this interest be nourished properly and not overfed.

As good Americans, we are accustomed to think of our country in superlatives. Consequently the general public probably feels little surprise, when it hears at monthly intervals that American ship builders are leading the world. Such a condition is merely what we have learned to expect, as in most lines of industrial activity we talk easily of "leading the world" and in many cases we are telling the truth. However, a few years ago we shut our eyes to the condition of our ship building industry and talked of something more pleasant. Now that these same ship yards have been revivified by a transfusion of some of Europe's golden life blood, we fall naturally into the habit of thinking of them as leading the world and, as a careless corollary, of our merchant marine as a problem that was troublesome for a time, but which has been solved.

Where Are the Ships Going?

Without discounting the work being done in American ship yards, it should be beneficial for Americans to learn just what is happening to the ships that are being built, and whether or not our merchant marine is measuring up to the expectations of 30 months ago.

The vessels built in American ship yards in the year ending June 30, 1916, aggregated 325,413 gross tons. This exceeded 1915 by 100,000 gross tons and also surpassed 1914, 1912, 1911 and 1909, but was smaller than any other year since 1898. It barely exceeded 1848 and was less than in 1852, 1853, 1854, 1855, 1856 and 1857.

Yet the total increase in American merchant shipping during the year was only 80,220 gross tons, while in 1915 the increase was 460,741 gross tons. The 1916 increase was the smallest of any year since 1898 with the exceptions of 1909, 1912 and 1914, despite the fact that the world was crying for more and more ships, that opportunities for profit were never greater, and that months before, a hope that America was again to have a merchant marine worthy of her had begun to spring up.

The gain in tonnage during 1916 included, in addition to the ships built, 83,480 gross tons transferred from foreign flags to the American; 2,726 gross tons sold to private owners by the government, and 492,999 gross tons which is listed by the bureau of navigation under "other sources", a total increase of 904,618 gross tons. While this is the greatest gain of any year on record, it is only 326 tons ahead of 1915.

The decreases during the year included 136,293 gross tons lost; 56,811 gross tons abandoned; 102,479 gross tons sold to aliens; 24,433 gross tons sold to the government; 20,027 gross tons exempt under the act of April 18, 1874, and 484,355 gross tons listed under "other causes", a total decline of 824,398 gross tons. With the exception of 1876, this was the greatest decrease in any year in our history.

What Influences Growth or Decline?

As the bureau of navigation points out, the growth of our merchant marine is the net result of the influence of four principal factors: The building of American ships at home; the transfer of ships from foreign to American registry; the loss or abandonment of ships, and the transfer of American ships to foreign registers and flags. We find in studying these principal factors that the tonnage built in 1916 increased about 100,000 gross tons over 1915, while the tonnage lost decreased 18,000 gross tons, a net increase of 118,000 gross tons; that the tonnage transferred to the American flag decreased about 440,000 gross tons, while the tonnage transferred from the American flag increased about 84,000 gross tons, a net decrease of 524,000 gross tons. Thus the net loss, considering these four factors only, was about 406,000 gross tons.

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The most significant change during the year is not the increase in the tonnage built, as we patriotically would prefer to believe, nor is it the big decrease shown in the transfer of ships from foreign to American registry, as these transfers naturally were made soon after the passage of the act of Aug. 18, 1914. The significant change is the increase in transfers from American to foreign registry. The bureau of navigation in its annual report for the fiscal year ending June 30, 1916, calls the heavy withdrawals from American registry "exceptional and disappointing". The total of 102,479 gross tons deducted from American merchant shipping through transfers to aliens is the largest of any year since the close of the civil war. Thus American ships now are forsaking American registry as freely as when Confederate cruisers were preying on our commerce.

What is the reason?

Of course, we know that merchant ships are in demand, that foreigners want to buy vessels, that prices are high and that American owners, in some cases, have been selling old ships for more than they cost years ago. But if the ships are valuable to others, why not to us? If freight rates are so high that initial cost is unimportant, why do not more American owners grasp the opportunity to pocket the profits?

The bureau of navigation reports that in the first quarter of the present fiscal year, 48 American vessels of 76,880 gross tons have been sold to foreigners. This statement, as the bureau says, is incomplete as the sales abroad are reported through consuls and all of their reports have not yet been received.

Not Afraid of Hostile Torpedoes

The most active buyer last year was Great Britain, and yet her flag is the magnet that draws a hostile torpedo. Norway ranked third as a buyer of American ships last year, but is second, and probably first now. Yet Norway's losses in the war exceed those of any of the belligerents except Great Britain. American losses have been only one-twentieth of Norway's. Nevertheless, ships are forsaking the American flag for the Norwegian. The fact seems clear that there is something about American registry that is more deadly than an enemy torpedo.

Many of the ships now being built in our ship yards are for foreign owners. Naturally we want this foreign business and hope to retain it, but it should be clearly kept in mind that while these foreign orders swell the tonnage under construction in American ship yards, they do not increase the tonnage of American merchant shipping. In abnormal times like the present, these orders may even act to curtail the prospective increase in American merchant shipping, as the overtaxed yards cannot find berths for the ships American owners might wish to order.

The government reported a few days ago that only 14 steel vessels of 39,020 gross tons had been built in American yards for foreign owners in 1916. This fact has been used by some people to back up their belief that only a small portion of the ships recently built or now building in American yards is destined for foreign registry.

Yet the government itself doesn't hesitate to state that it has difficulty in determining what proportion of the ships under construction were ordered for foreigners. Out of 1,225,784 gross tons under construction in American yards on July 1, 1916, the bureau of navigation states that fully 125,000 gross tons were for foreign owners. The report says: "The figures cannot be stated exactly because considerable tonnage is reported under construction for builders' account and whether, when completed, it will sail under the American or a foreign flag is yet to be determined.

"Since July 1, 1916," the report, which was issued on Oct. 10, continues, "the tonnage ordered in American yards for foreign ship owners exceeds that ordered for American owners."

The Marine Review, in a table showing vessels of more than 200 tons gross under construction in American yards on Jan. 1, 1917, lists 52 ships now building in Great Lakes ship yards. Of these, 37 ships are of Welland canal size, that is, they are the maximum size that can pass through the Welland canal between Lakes Erie and Ontario, and reach salt water by way of the St. Lawrence river. At least one-half of these ships are for foreign owners. Many of them have been ordered through brokers who have been agents for aliens in previous ship deals, while some have been ordered outright by foreigners. Recently a high official of one of the lake yards stated unequivocally that in his judgment probably more than one-half of these lake-built ships were for foreign owners. He also pointed out that some ships were being built for American owners, who intended either to offer the boats for sale, or to transfer them to foreign registry at the end of the war.

An American Boat for 24 Hours

Take the case of ANTWERPEN. She was a big oil carrier of 7,955 gross tons. To the casual observer of ship building records of a year ago, she appeared to be another big addition to this country's merchant marine, as she was shown as under construction for a big American oil company. Yet 24 hours after she was delivered by her builders, ANTWERPEN was put under Dutch registry and the stars and stripes replaced by the flag of Holland.

A summary of the principal facts presented previously shows that:

The tonnage of ships built in 1916 barely exceeded 1848; was less than in any year in the period 1852-1857; exceeded the totals in 1914, 1912, 1911 and 1909, but was less than in any other year since 1898.

The increase in documented tonnage last year was only 80,220 gross tons against 460,741 gross tons in 1915. The increase was the smallest of any year since 1898, except 1909, 1912 and 1914.

The total gain in 1916 in documented tonnage was the largest of any year in history, but barely surpassed 1915.

The total loss in 1916 in documented tonnage was the largest of any year in history except 1876.

The total of 102,479 gross tons lost to our merchant marine through the transfer of ships from American to foreign flags, was the largest of any year since the close of the civil war.

Norwegians run 20 times more risks in the war zones than Americans—but the Scandinavians are ordering more ships in our own yards than we are, and they are buying as many or more ships from us than any other nation.

In the first quarter of the present fiscal year, foreigners ordered more ships in America than Americans did.

These facts certainly justify the conclusion that the American merchant marine is not growing as its proponents hoped two years ago that it would. These facts lead more clearly to an appreciation of the real

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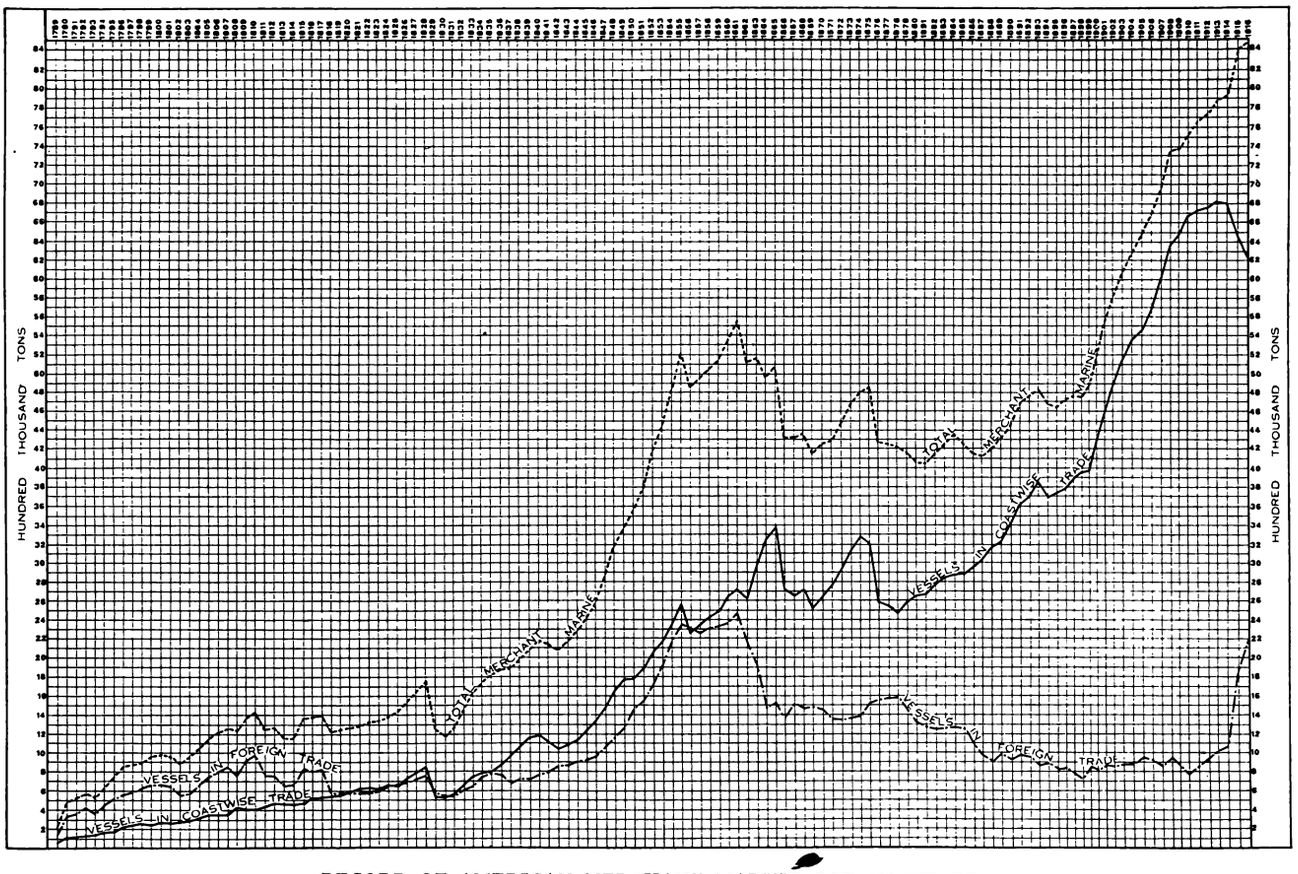

RECORD OF AMERICAN MERCHANT MARINE FOR 128 YEARS

This chart shows graphically the complete record of the American merchant marine. The decline in the relative importance of the vessels engaged in foreign trade is shown clearly. In the first years of the country's history these vessels out-ranked the coastwise tonnage, but since 1818, with few exceptions, they have been in second place. The chart also shows that only 24 months ago the tonnage of vessels engaged in foreign trade barely exceeded the record for 1810—more than a century of comparative stagnation. The big increase in foreign-trading vessels in the last two years has been, of course, partly at the expense of the coastwise tonnage, as shown by the sharp upturn of the lower line and the quick dropping off of the second line.

condition of our merchant marine today than does the widely heralded statement that our ship yards are filled with orders for 18 to 24 months ahead. These facts show us that the big question of an American merchant marine is as big now as it was two years ago and apparently is just about as far away from a solution.

Americans have done much to meet the emergency created by war conditions. Our tonnage engaged in foreign trade has been growing, but its growth has been at the expense of the tonnage engaged in coastwise trade. The sum total of the two, that is, the total documented tonnage, has remained almost stationary during the year when the greatest gain should have been made.

The shipping board, which is now completing its organization, can do great good or great harm to our merchant marine. Shipping men hope for the former and fear the latter. The formation of a shipping board is generally conceded to be a wise step, the ultimate wisdom of which will depend upon the discretion with which the board uses its broad powers.

Farmer Gets Place on Shipping Board

PRESIDENT WILSON has sent to the senate the nomination of Raymond B. Stevens, of New Hampshire, as a member of the United States shipping board. Mr. Stevens was named by the President to fill the vacancy caused by the resignation of Bernard N. Baker, Baltimore.

The nomination was a distinct surprise to most of those who have followed the history of the shipping board since its authorization by congress. When it was found that the Great Lakes had been ignored in the original list of five appointees, keen disappointment was felt that the marine interests of the inland waterways had not been given representation. Practically one-third of the documented tonnage under the American flag is owned and operated on these northern lakes and it had naturally been concluded that at least one member would be picked from among the shipping men in that district. Apparently politics have played an important part in elevating Mr. Stevens to a place on the board. Not only does his appointment pass over the right of the Great Lakes to representation, but he himself apparently falls under the class of a "lame duck". He is known principally as the father of the so-called Stevens price maintenance bill which has been actively agitated before congress in the last year or so. The congressional directory of January, 1915, gives his biography as follows: "Raymond Bartlett Stevens, Democrat, of Landaff, was born at Binghamton, N. Y., June 18, 1874; educated at Harvard College and Harvard Law School; is a farmer; was elected to the sixty-third congress." He ran for the senate in 1914, but was defeated by Senator Gallinger. He was then appointed special counsel for the federal trade commission. He ran for the house last fall but was again defeated.

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Lake Carriers' Hold Annual Meeting

Members of Association Discuss Problems of Importance to Great Lakes Interests at Recent Meeting in Detroit—Year's Record Highly Satisfactory

PROBLEMS of interest to the men owning and operating the great fleets that ply the Great Lakes were discussed at the annual meeting of the Lake Carriers' Association, held at Detroit, Thursday, Jan. 18. The attendance was unusually large, ship masters and engineers as well as owners taking part in the proceedings.

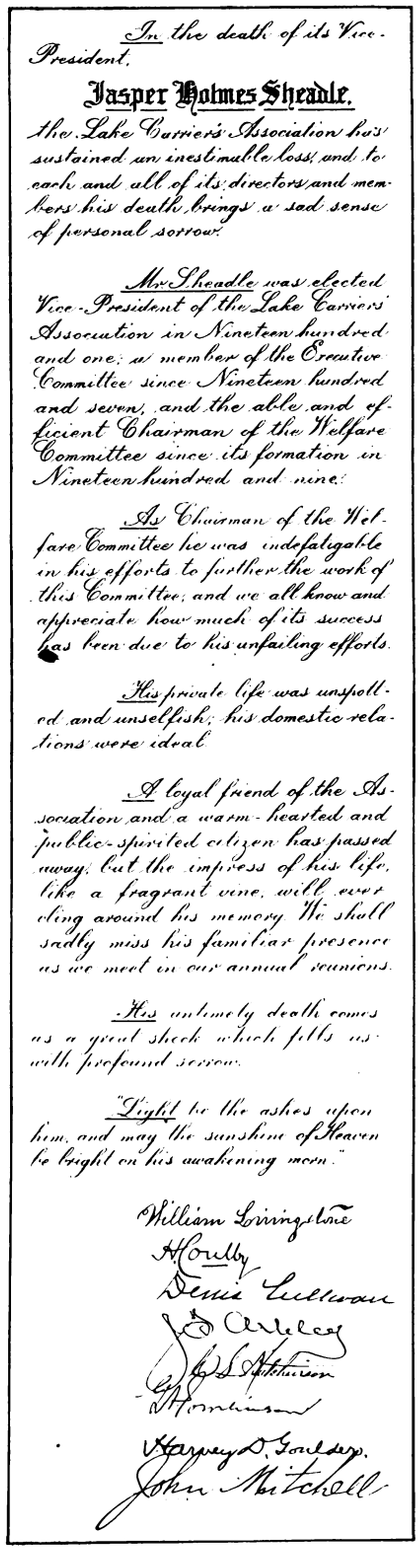
William Livingstone, the venerable president of the association was in the chair when the meeting was opened on Thursday morning. Mr. Livingstone was assisted in conducting the meeting by George A. Marr, secretary, and Harvey D. Goulder, general counsel of the association. There were 16,926.58 shares represented out of a total of 19,542.38.

Attention was called to the fact that the number of memberships in the association was decreasing at the same time that the tonnage was increasing. The tendency toward a decrease in membership, as first pointed out at last year's meeting, results from the concentration of the control of lake vessels and from the numerous sales of vessels. The increase in tonnage results from the new vessels added during the year, the tonnage of which has been only partially offset by the numerous sales. During the year the number of vessels decreased by 14, while the tonnage increased by 1,369 tons. At the close of the year the membership represented a total of 414 vessels in all classes, aggregating 2,013,962 tons.

President's Report

President Livingstone in his annual report summed up in a masterly style the salient features of last year's operation. He presented an interesting array of data concerning the influence of the war on American trade and the American merchant marine. Liberal extracts from the president's report are presented in another part of this issue.

Frank B. Smith, chief engineer, Pittsburgh Steamship Co., submitted the report of the special committee on water purification. This committee had been appointed a few days before the meeting following the announcement by the surgeon of the United States public health service in charge of the sanitary district of the Great Lakes that lake vessels must be equipped with some form of water purifying apparatus before leaving port at the opening of navigation this spring.



In the death of its Vice-President,

Jasper Holmes Sheadle,

the Lake Carriers' Association has sustained an inestimable loss, and to each and all of its directors and members his death brings a sad sense of personal sorrow.

Mr. Sheadle was elected Vice-President of the Lake Carriers' Association in Nineteen hundred and one; a member of the Executive Committee since Nineteen hundred and seven, and the able and efficient Chairman of the Welfare Committee since its formation in Nineteen hundred and nine.

As Chairman of the Welfare Committee he was indefatigable in his efforts to further the work of this Committee, and we all know and appreciate how much of its success has been due to his unfailing efforts.

His private life was unspotted and unselfish; his domestic relations were ideal.

A loyal friend of the Association and a warm-hearted and public-spirited citizen has passed away, but the impress of his life, like a fragrant vine, will ever cling around his memory. We shall sadly miss his familiar presence as we meet in our annual reunions.

His untimely death comes as a great shock which fills us with profound sorrow.

"Light be the ashes upon him, and may the sunshine of Heaven be bright on his awakening morn."

William Livingstone
H Coulby
Denis Sullivan
J D Ahlers
John S Pritchard
A Thomson
Harvey D. Goulder.
John Mitchell

REPRODUCTION OF A MEMORIAL DRAWN UP AND SIGNED BY OFFICERS OF THE LAKE CARRIERS' ASSOCIATION FOR PRESENTATION TO THE FAMILY OF THE LATE JASPER H. SHEADLE

The committee reported that the surgeon, Dr. J. O. Cobb, had stated emphatically that "no boats will be permitted to leave port at the opening of navigation next spring without one of the approved methods of water purification being installed". He had told the committee that notification of the government's attitude had been given to lake interests some months before and that the government was not disposed to recognize any grounds for delay at this time.

The special committee had taken up a preliminary investigation of the engineering details involved in meeting such a ruling. Conferences had been held with representatives of several manufacturers of water purifiers. Mr. Smith submitted to the association the results of these conferences. According to the report, the methods of water purification which were considered were distillation, heating by a steam jet and sterilization by means of ultraviolet rays.

Call in Expert

The committee had been assisted in its work by C. Arthur Brown, chief engineer of the engineering bureau of water purification of the United States Steel Corporation, one of the country's leading authorities on the purification of water. H. P. Letton, sanitary engineer, public health service, attended the conference held by the committee with the district surgeon.

Although the subject had been brought up so recently that many of the members were not familiar with the situation until the special committee reported, the association acted promptly. Unanimous approval was given to a resolution authorizing President Livingstone to appoint a special committee to consider the question. This committee was to decide upon the measures best adapted to meet the situation.

In presenting the report of the welfare plan committee, E. C. Collins, acting chairman, referred with emotion to the splendid work of the committee's late chairman, Jasper H. Sheadle. Mr. Sheadle had been chairman of this committee since it was first authorized in 1909. He had de-

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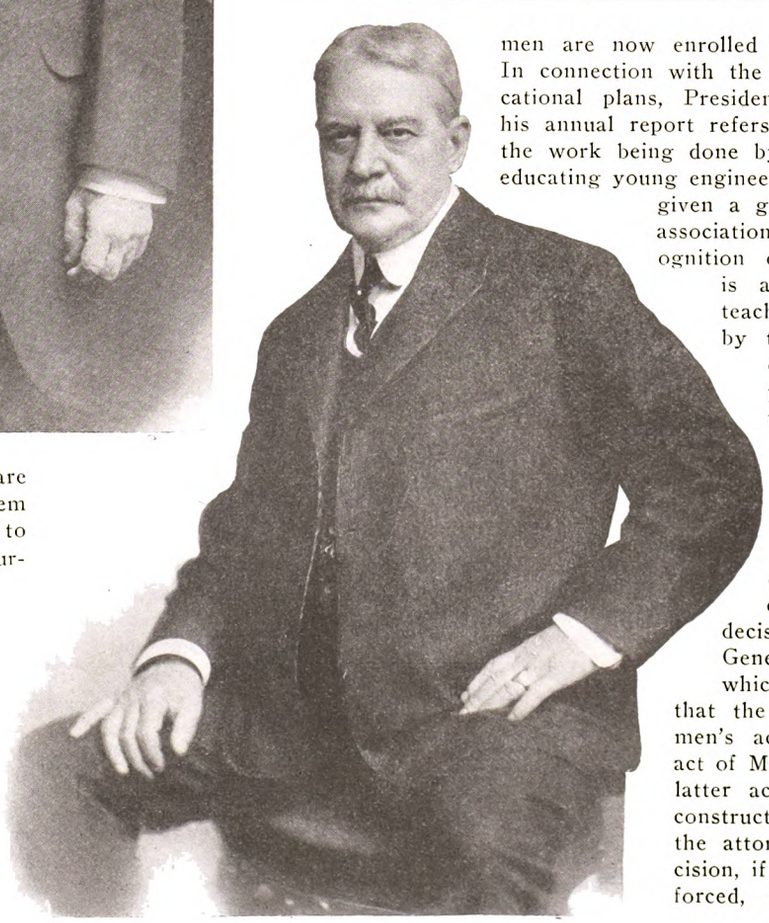
voted an immense amount of time and energy to evolving and putting into effect the comprehensive plans for promoting the welfare of the sailors on the Great Lakes, which have been so successfully carried out by the Lake Carriers' Association in recent years. Mr. Collins stated that he regarded the savings plan which the late chairman had initiated as a most fitting monument to Mr. Sheadle and as a most suitable memorial to the tireless devotion with which he had planned and executed the work of bettering the condition of the sailors. Mr. Collins pointed out the great importance of the work being done by the schools in navigation and in marine

President William Livingstone at left; Secretary George Marr at right; General Counsel Harvey D. Goulder at bottom of page.



engineering. These schools are doing much to meet a problem that had at times threatened to become serious, that is, the securing of sufficient licensed officers, particularly engineers, to man the lake fleet. Last year 35 graduates of the schools at Cleveland and Marine City secured licenses. The percentage of graduates who passed the examinations successfully was high, and it is probable that a much greater number will secure licenses this year, as 99 men are now enrolled in these schools. In connection with the association's educational plans, President Livingstone in his annual report refers appreciatively to the work being done by Harry Stone in educating young engineers. Mr. Stone was given a gold watch by the association last year in recognition of his work. He is a naturally gifted teacher, as evidenced by the large number of his pupils who pass the examinations successfully.

At the request of the members, Harvey D. Goulder, general counsel, discussed the recently announced decision of Attorney General Gregory, in which it was decided that the La Follette seamen's act superseded the act of March 3, 1897. This latter act referred to the construction of vessels, and the attorney general's decision, if sustained and enforced, would necessitate

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the reconstruction of all vessels, built since 1897, which did not meet the requirements of the seamen's law passed March 4, 1915.

The decision is dated July 26, 1916, but for some unexplained reason was not made public until a few weeks ago. Mr. Goulder, after pointing out that his remarks were not to be considered as a criticism of the attorney general's office, expressed the opinion that there was a reasonable doubt whether the ruling would be sustained if the case was carried to court. Mr. Goulder questioned the constitutionality of any law which attempted to exercise retroactive influence.

The association unanimously decided to clear up the situation brought about by Mr. Gregory's ruling. A committee was appointed to take up the problem. This committee will probably try three different courses of action: To secure favorable action on a congressional amendment to the seamen's law which will clear up the involved point; to attempt to secure a reversal of opinion from the attorney general, or to attempt to secure an interpretation by a federal court of the real meaning of the law. Attorney General Gregory's ruling is given in full on another page of this issue.

The association next discussed the condition of the Grain Clearance Corporation. It was practically decided to continue the present system of handling grain cargoes and, at the same time, to assist officials of the Grain Corporation in making good the deficit arising from the operations in 1916.

A. W. Thomson explained the present condition of the Grain Corporation. During 1916, the corporation not only lost its capital stock of $40,000, but $19,000 in addition. To meet the deficit, officials of the corporation asked the owners of grain vessels to contribute 12 cents a thousand bushels on the grain carried. This fund will replace the $19,000, but will not replace the capital. Some of the owners have already paid their share of the loss. President Livingstone was authorized to appoint a committee to assist officials of the corporation in clearing up the situation.

Emphasis was placed by several speakers upon the importance of widening the Livingstone channel to 450 feet. The present channel is only 300 feet wide, but the rock cut was carried to a width of 450 feet at the time that the rest of the channel was finished to a 300-foot width. The speakers pointed out the great importance of minimizing the chances for accidents and of avoiding possibilities for delay. The latter was particularly true in seasons like 1916, when every boat was in commission at all times. A wider channel would reduce the likelihood of accidents and collisions. The association endorsed a resolution urging favorable and prompt action by the government in widening this channel. Unanimous approval was also given to resolutions endorsing the proposed increase in the salaries of employes of the steamboat inspection and lighthouse services.

The constitution was amended by striking out the provision limiting the amount of dues which the directors could assess. The amendment at first provided an increase in the rate to 10 cents, but at the suggestion of Harry Coulby, no limit was fixed.

William Livingstone was re-elected president of the association. J. S. Ashley was elected vice president, a post formerly held by the late Jasper H. Sheadle. The other officers were re-elected, Harvey D. Goulder as general counsel, George A. Marr secretary and assistant treasurer, and George P. McKay treasurer. A. R. Rumsey was again chosen chief commissioner. Horace S. Wilkinson, Syracuse, N. Y., was elected a member of the executive committee to succeed the late Mr. Sheadle. The other members were re-elected, including William Livingstone, Detroit; Harry Coulby, Capt. John Mitchell, J. S. Ashley and Capt. C. L. Hutchinson, Cleveland; Capt. D. Sullivan, Chicago; G. A. Tomlinson, Duluth. The alternates are C. D. Dyer, Pittsburgh, and E. C. Collins, A. F. Harvey, J. T. Kelly and W. C. Richardson, all of Cleveland. David W. Stocking, Duluth, and Gordon B. Houseman, Cleveland, were elected to the board of directors.

The annual banquet of the association was held Thursday evening, Jan. 18, at the Hotel Statler, with President William Livingstone as toastmaster. The banquet attracted a large number. The speakers included a number of Canadian officials representing both the Canadian government and the Dominion Marine Association. The Canadian speakers brought out in their addresses the willingness of the marine interests as well as the government to co-operate with the vessel interests on the American side of the Great Lakes in all efforts to improve the conditions surrounding the great commerce of these waterways. However, the speakers emphasized the strain that the European war was imposing on Canadian resources, and asked that only such work as was imperative be taken up until Canada had had an opportunity to recuperate.

Board of Directors

H. Coulby	*Cleveland*
John Mitchell	*Cleveland*
H. D. Goulder	*Cleveland*
W. C. Richardson	*Cleveland*
J. S. Ashley	*Cleveland*
W. D. Becker	*Cleveland*
Walton H. McGean	*Cleveland*
A. F. Harvey	*Cleveland*
H. K. Oakes	*Cleveland*
Geo. M. Steinbrenner	*Cleveland*
Roy A. Williams	*Cleveland*
J. Burton Ayers	*Cleveland*
W. G. Stewart	*Cleveland*
John T. Kelly	*Cleveland*
A. E. R. Schneider	*Cleveland*
C. C. Canfield	*Cleveland*
W. M. Williams	*Cleveland*
R. D. Mitchell	*Cleveland*
A. T. Kinney	*Cleveland*
A. W. Thomson	*Cleveland*
W. P. Schaufele	*Cleveland*
C. L. Hutchinson	*Cleveland*
E. C. Collins	*Cleveland*
Gordon B. Houseman	*Cleveland*
D. Sullivan	*Chicago*
A. C. Sullivan	*Chicago*
W. Livingstone	*Detroit*
J. J. Boland	*Buffalo*
J. B. Rodgers	*Buffalo*
G. A. Tomlinson	*Duluth*
David W. Stocking	*Duluth*
Howard L. Shaw	*Bay City*
H. S. Wilkinson	*Syracuse*
C. D. Dyer	*Pittsburgh*
W. P. Snyder Jr.	*Pittsburgh*
W. H. Smith	*Montreal*

To Study Terminals

The Society of Terminal Engineering has been chartered in New York to promote the study of terminal engineering and mechanical freight handling. The officers are as follows: President, H. McL. Harding, New York; vice presidents, Gen. W. H. Bixby, U. S. A., Washington, and John Meigs, Philadelphia; treasurer, W. J. Barney, New York; secretary, J. Leonard, 1133 Broadway, New York. The organization has three membership grades, members, associates and juniors. The member grade is open to professors of civil and mechanical engineering and engineers specializing in terminal work. Associate membership applies to officers and others connected with concerns manufacturing freight handling apparatus and terminal equipment, and those whose work enables them to co-operate with the society. Junior members comprise recent graduates who will specialize in terminal engineering and young engineers.

The largest full cargo of rye ever taken from Boston to Norway—300,000 bushels—is bound for Christiania in the steamship HERMIONE.

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Great Lakes Records Fall in 1916

Annual Report of the Board of Directors, Executive Committee and Officers of Lake Carriers' Association is a Record of a Notable Year

FROM every point of view the year has been the most notable in the history of Great Lakes' transportation. In contradistinction with 1915 when uncertainty and lassitude were early characteristics, 1916 opened with an unprecedented demand for vessel tonnage, a demand, indeed, that taxed the association to the maximum of capacity, but your members rose to the occasion with promptness and executive ability that admirably handled the situation.

A spring and summer marked by unusually high stages of water was a primary cause in holding the situation well in hand. Dispatch was an outstanding feature; it was extraordinary through the first five months and would probably have been continued to the end but for the car famine that developed early in September and became more acute as the fall advanced, causing vexatious delays in the unloading of ore and interrupting a heavy movement in coal.

But despite the ensuant setbacks the season was a matchless one for the vessels and would have closed unshadowed but for the storms of May 3 and Oct. 20, in which five vessels foundered, entailing the loss of 73 lives.

Increase of Tonnage

The association will begin 1917 with a loss in membership, so far as the number of vessels is concerned, due in a large degree to vessel sales for foreign and coastwise trade, but there has been such a gratifying increase through new construction that there is a net increase of 1,369 tons in the total tonnage of the association. The membership represents a total of 2,013,962 tons, and there will be further increases early this year through new finished construction and other vessels almost ready for launching.

One year ago your president pointed to the impending impetus in the iron industry in direct reversal of conditions as they had prevailed throughout the whole lean year of 1914. When the vast buying movement in ore began on Dec. 7, 1915, the price of ore for the succeeding year was advanced 70 cents a ton, excepting that Mesabi bessemer went to an advance of 75 cents. In line with this increase there was a slight upward movement in lake freight rates on ore, the gross rate going up 10 cents, to 60 cents from the head of Lake Superior, 55 cents from Marquette, and 45 cents from Escanaba. Hence long before the opening of navigation the fact was firmly established that 1916 would furnish a season of intense activity and would be characterized by a strain never before encountered. Predictions were free that the total ore movement would exceed 55,000,000 tons, while the most optimistic figured upon a movement that would in the aggregate total 60,000,000 tons. With a correspondingly increased demand for grain, coal and other tonnage, all available ships were ready for the opening of navigation on April 15. March was marked by such unprecedented cold and storms, however, that there was more ice in the lakes than the average for 10 years. After April 1 there was 50 miles of ice on Lake Superior, a condition that never before obtained; Lake Huron was a solid sheet at the lower end and many vessel owners were dubious about an opening of navigation previous to May 1. On April 11, however, the heavy ice began to soften, and to relieve restlessness and appease the call for ore, the stock of which had been somewhat depleted, ice breakers were commissioned to force an opening through the upper rivers, Whitefish bay, the straits of Mackinac, and Green bay. The ice-breaking steamer NEVADA was started from South Chicago to smash her way into Escanaba and thence through the straits, and to meet, in St. Marys river, the ferry ALGOMAH sent out by the Canadian government to open up Whitefish bay and the upper rivers. Fortunately the ice went out of the straits on April 17 and navigation on Lake Michigan opened on the same day when the steamer HENRY PHIPPS cleared from South Chicago for Escanaba. The steamers C. W. KOTCHER and WM. P. SNYDER JR., made a dash into the heavy ice at Buffalo on April 16, and succeeded in getting through, but others that followed were caught and it was not until April 18, when a fleet of 18 vessels got away, that the lower end of Lake Erie was pronounced safely open. By April 19 the ice breakers had completed their work and at 5 p. m. on that day C. W. KOTCHER, upbound, reached the Soo canal, and the next morning was the first vessel to lock through. On April 20 the steamer WILLIS L. KING passed down at Detroit with the first ore cargo of the year, from Escanaba. On April 22 navigation opened at Duluth when the steamer THE HARVESTER arrived and the steamer JAMES B. COLGATE cleared from that port; on April 22 also, 17 vessels carrying 3,560,000 bushels of grain cleared from Fort William and on April 23 every port and channel on the lakes was open.

Dispatch was slow for several days, however, the result of thick weather in the upper lakes and heavy ice that prevented navigation of the rivers by night. Notwithstanding the belated opening and the almost constant interference 1,658,411 tons of ore came down in the 10 days of April, this being a new record over the banner month of April, 1910. Unfavorable conditions continued to prevail and the freight movement was hampered through the first 10 days of May, yet a new May record for tonnage through the Soo canal was established, there having been locked through a total of 12,293,476 tons of freight, the largest amount in history up until that time and surpassing the entire season's tonnage of 1892. More noteworthy, though, was the ore movement for this month in question, it having totaled 8,449,580 tons as against 5,012,359 tons in the preceding year and 7,284,212 tons in 1913. It was, as a matter of fact, the largest movement of ore for any month covering all time. But this record, extraordinary though it was, was not long sustained, for in June a 9,000,000-ton month was recorded for the first time. It was now apparent that the ore movement for the year would be limited only by the available capacity. Very happily for all interests concerned, high water levels maintained throughout the summer and when, with these, there was combined another big factor in the lake freight situation—the completion of dredging operations in Lake St. Clair—the recommended draft was brought up to 20 feet 10 inches, an increase of 15 inches between the spring draft and the maximum in August, to drop only to 20 feet 5 inches and finally to 20 feet 3 inches, as the water began to recede in the fall.

Effect of High Water

In consequence extreme cargoes, dominated by wonderful dispatch furnished eventful history. The huge bulk freighters brought down cargoes of ore nearly 1,000 tons in excess of what they had carried into Lake Erie previously, while the general average increase was not far short of 500 tons and this without loading to within 5 or 6 inches of the maximum. The same conditions prevailed in the matter of increased cargoes of wheat and grain and upbound cargoes of coal.

Thus accelerated, the lake shipping

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movement continued in gigantic proportions and July, August, September and October were all characterized by ore movements exceeding 9,000,000 tons, the month of August setting the high water mark of 9,850,140 tons of ore, making an increase of 1,769,023 tons over the banner movement of August one year ago. As the fall movement drew apace and the entire country became enwrapped in a gigantic rail freight movement, it was inevitable that the car shortage grow more acute. From Sept. 1 on the dispatch was materially lessened and ore vessels were held in lower lake ports from four days to one week, and coal charters were hampered to an almost equal extent. Nevertheless, the ore movement for October reached the wonderful figures of 9,116,096 tons, or an increase of 1,969,223 tons over 1915. This splendid record had a reassuring effect in interested channels throughout the country for it indicated then that upward of 62,000,000 tons of ore could be transported during a season without extreme difficulty; as well the situation as now presented removed any anxiety that may have existed as to a possible shortage of ore stock in the winter. Heavy snow and zero temperature characterized a portion of November and yet the mines sent forward 5,715,452 tons of ore in the short month. The closing days of the season were marked by some mild weather that furnished summer dispatch, and although many vessels were withdrawn from the fleet the 12 days of December furnished a movement of 1,085,900 tons of ore as against 57,236 tons in 1915 and the bare 1,411 tons in 1914. This brought the 1916 movement of ore up to 64,734,198 tons and shattered the lauded record movement of 1913 by 15,663,720 tons.

Fall Movement Makes Record

Moreover, the movement from Aug. 1 was far in excess of the splendid record established in the corresponding period one year ago. It will be recalled that during that period of feverish activity 27,593,501 tons were moved, but this last year the movement for the similar five months covered 35,368,474 tons.

By its great work of 1916 the fleet demonstrated beyond cavil it is adequate, if not supreme, for any emergency. So rapid has been the progress in lake navigation and dispatch, and so vast its extent, that the shipping of the Great Lakes commands the admiration of the world. The achievement of 1916 will live long in memory even though it may soon be improved upon.

The volume of ore, coal and grain handled in 1916 totaled 114,543,511 net tons. This was 25,347,636 net tons more than was handled in 1915, 42,603,908 more than in 1914, and exceeded the record-breaking movement of 1913 by no less than 14,525,047 net tons.

The coal movement received a fine start when navigation opened, in fact, through the first four months the amount of both kinds of coal shipped exceeded the heavy movement of the corresponding period in 1915, but the car shortage that developed early in the fall so seriously hampered the trade in this commodity that the year's movement fell off perceptibly from early calculations. However, it was a movement that totaled 31,485,235 net tons and this was 5,265,235 tons more than the coal tonnage of 1915, 4,457,007 tons more than 1914, but 1,877,144 tons less than the coal movement of 1913.

Grain Shipments Hampered

Unquestionably the keen demand for ore tonnage prevented what might have been a record-breaking movement in grain, although the congested condition of the elevators at Buffalo during late navigation because of a lack of cars and the railway embargo on freight, was a contributory cause for the year's grain movement having fallen off from record-establishing proportions. And yet the grain movement on the Great Lakes for 1916 shows a decrease of only 542,840 net tons from that of 1915. It was 762,125 tons more than 1914, but 1,141,185 tons less than the movement of 1913.

In connection with this fruitful year of lake transportation combined with excellent dispatch, it may be added as a matter of interest and record that heretofore the largest cargo of ore ever transported was 13,333 tons into South Chicago in 1906, and that the record for a Lake Erie port stood at 12,622 tons. This last mentioned amount was frequently put into eclipse by several different vessels during 1916 and the zenith in ore carrying cargoes was reached last July 26 when the steamer Wm. P. Snyder Jr., carried 13,694 tons of ore into Cleveland. The steamer Col. James M. Schoonmaker transported 14,474 tons of coal from Ashtabula to Duluth, and W. Grant Morden brought down 490,724 bushels of wheat. In the matter of dispatch the steamer Schoonmaker delivered at Cleveland two cargoes within seven days that totaled almost 25,000 tons of ore, and on another occasion this same vessel unloaded 13,904 tons of coal and took on 12,757 tons of ore within a period of 48 hours, including a shift from Superior to Duluth docks.

Under the influence of an active ore freight market, grain rates were high during the entire year, in fact it was not until the cold period of November set in, causing a lull in the ore movement, that the rates from Lake Superior dropped to as low as 3 cents. With more than 200,000,000 bushels of wheat and grain to move after the opening of navigation, of which 60,000,000 bushels were in Duluth, grain rates were a matter of speculation throughout the winter and spring. On Feb. 4 two vessels were chartered at Fort William at 6½ cents, the highest price on winter storage spring delivery ever recorded in the history of the lakes. On March 18 a rate was fixed of 5½ cents for the opening trip, 5 cents for the first half of May, and 4½ cents for the last half of May, but on March 22 the price advanced to 6 cents with a dispatch guaranty. Grain rates did not fluctuate in any marked degree throughout the height of the sailing season. The rate was firm at 5 cents in April and at 4½ cents in May and June. There was an advance to 5 cents again early in July and on July 25 the rate soared to 5½ cents. In August some charters were made at 4 cents but in the fall the rate was firm and steady at 4½ cents. A decreased rate did not develop until later in November when charters were made at 3 cents, while in the closing days of navigation the rate was returned to 4 cents to unload at Buffalo and 4½ cents to hold. There was a record breaking movement in grain up to the time of the car shortage and when this period arrived the movement fell off perceptibly, to reach the point in the closing days of the season where the elevators became choked and unloading a matter of days.

Early Coal Movement Heavy

The rate and the movement in coal kept pace with ore and grain. The coal movement was phenomenal through the first four months of the season and up to Aug. 1 the total receipts of coal at the head of the lakes were 600,000 tons in excess of the corresponding period of 1915. The established coal rate for 1916 was 35 cents to Lake Michigan and 30 cents to the head of the lakes, but at the end the price to Duluth went as high as 60 cents and $1.00 to Chicago.

In each of the 12 months of 1916 more than 3,000,000 tons of pig iron were produced and as the last three months of 1915 were also productive of tonnage in equal proportions, this made 15 consecutive months in which the production was above the three million mark. Under the impetus of the prosperous volume of business that became signally marked in the middle of 1915 the year opened with 303 stacks in blast, a gain of 84 per cent over Jan. 1, 1915, when 165 stacks were in operation. The maximum was reached in October, when 328 stacks were in full blast, and the year closed with 312 only because of the slow movement of coke. The pig iron production totaled 19,381,954 tons in the first half of 1916, as against 12,043,503 tons for the corresponding period of 1915.

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Report of Protective Association

Although Opportunities Were More Numerous, Accidents on the Great Lakes Were Relatively Fewer in 1916—Successful Year Financially

THE annual meeting of the Great Lakes Protective Association, held at Detroit, Friday, Jan. 19, served forcibly to emphasize the great importance of the work this association has carried on in recent years. The chairman, J. S. Ashley, in his annual report, and Harry Coulby and Harvey D. Goulder in short talks, called attention to the wholesome influence of the association's work.

Mr. Goulder pointed out that the association had accomplished a great work in increasing the safety of operations, and had lowered the cost of insurance. These two results had been brought about without injury to anyone connected with the trade, the sailors and owners benefitting from the enhanced degree of safety; the owners from the lowered cost of insurance, and the regular underwriters from the promotion of safety of operations, which had reduced their losses.

During four of the seven years of the association's existence, 25 per cent of the risk has been reserved from conventional insurance and has been carried by the association itself. The 1916 operations were highly satisfactory in a financial way, as careful estimates now indicate a profit of 46 per cent. The carrying of 25 per cent of the insurance was accomplished at an approximate rate of 1.823 per cent. The advisory committee, however, expressed the opinion that the year's record was not fully satisfactory as a number of accidents which occurred were avoidable.

As in 1916, the decision regarding the amount of insurance to be carried as well as the initial contribution was left to the decision of the advisory committee. It is probable that the association will continue to carry 25 per cent of the insurance of its subscribers. The regular underwriters, it is believed, will again name the 1916 rate of 3¼ per cent net. The rate of the initial contribution of the association last year was 3¼ per cent, the same as in 1915.

All of the members of the advisory committee were re-elected, A. E. R. Schneider, Cleveland, being chosen to fill the vacancy caused by the death of Jasper H. Sheadle. The other members of the committee are J. S. Ashley, Capt. W. C. Richardson, Capt. Charles L. Hutchinson, Harry Coulby, C. D. Dyer, R. A. Williams, John J. Boland, William Livingstone, Capt. D. Sullivan and W. H. Becker. These members were nominated by a committee composed of J. B. Rogers, Buffalo; S. C. McLouth, Port Huron; Gordon B. Houseman, George M. Steinbrenner and W. P. Schaufele, Cleveland. The advisory committee meets later to elect its officers. The present officers will probably be re-elected, including J. S. Ashley, chairman; Capt. W. C. Richardson, treasurer; Harvey D. Goulder, counsel; George A. Marr, secretary and attorney in fact.

Care in Loading

The association's practice of taking the drafts of vessels, both up and downbound, at Sault Ste. Marie, was continued during the past year. On account of the possibility of passing through the Canadian lock with unusually deep drafts this season, it was found necessary to establish draft readers on the Canadian side. Reports have been received daily of vessels passing through all the locks and in cases where the recommended draft has been exceeded, subscribers have been notified to that effect. It is noticeable, however, that comparatively few cases of overloading have been reported, indicating the watchfulness on the part of the masters to conform to the recommended loading drafts published by the Lake Carriers' Association.

The report of the operations in 1916, as given in an accompanying table, shows a surplus of $164,661.52, which is equal to 46.085 per cent of the net contributions, as against 18.292 per cent in 1915 and 42 per cent in 1914. The association finished the year with but one total loss, the composite steamer S. R. KIRBY, which foundered in Lake Superior on May 8. The total losses on all the lakes during the season numbered 14, the association being affected by only the one. This fact brings out strongly the benefits of the rules and recommendations drawn up by the association for safeguarding its ships.

At the close of the year, there were 159 vessels with a total gross registered tonnage of 812,808 tons in the membership of the association. During the fiscal year of 1916 there were 175 vessels in the membership and on these vessels, 175 certificates of insurance were written, the valuation aggregating $42,350,874. Of this, the association assumed 25 per cent, or $10,587,717.

The following is a liberal extract from the annual report which was presented to the members at the Detroit meeting:

"The season of 1916 opened on April 15, and within a week from that date practically every vessel in the membership was in commission. Accidents requiring the laying up of vessels for lengthy periods to repair were noticeably small this year, so that practically all our ships were in continuous operation the entire season, the last vessel reaching port of destination on Dec. 23. The unprecedented demand on vessel tonnage for the movement of ore, coal, grain and all classes of merchandise required the quickest possible dispatch. Extraordinarily warm weather prevailed during the midsummer, taxing the vitality and the usual efficiency of our sailors. The demand for labor in all channels of business had a noticeable effect in the personnel of our crews; quite unusually severe gales occurred in the fall months which delayed and congested vessels. All these things constituted an unusual strain on our navigators, but notwithstanding such difficulties, we have completed the season with but one total loss—the composite steamer S. R. KIRBY, which foundered on May 8 off Eagle Harbor with the loss of 20 members of her crew—only the mate and one fireman being saved. This unfortunate disaster has never been explained, and undoubtedly never will be, as she was considered a good, seaworthy ship and had weathered many a gale of far greater severity than that in which she was lost.

"The total losses on all the lakes during the season numbered 14 vessels with an approximate insurable value of $625,000. The loss on the steamer S. R. KIRBY, the only one in which the association was interested, was $90,000, which brings out prominently the efficiency of our navigators under the influence of the association's rules for safeguarding its ships. This is prominent, also, with regard to the partial losses resulting from collisions, strandings and similar accidents. Through examination of surveys reported by R. Parry-Jones, the underwriter's representative, we find 452 surveys reported showing an estimated loss of $1,056,283. Of these,

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136 surveys were held on vessels in the association, 10 of which showed no damage. On the other 126 surveys, the estimated damage was $367,734. When we take into consideration that the total gross tonnage of vessels in the association is approximately two-thirds of the whole insured fleet, it will at once be apparent that our partial losses are in percentage much smaller than on the vessels not in our membership, further demonstrating the satisfactory purposes of our labors eventually to eliminate the avoidable accident.

"While we know that preventable losses have materially decreased since the inception of your association, it is an unquestionable fact that a great many of the partial losses this season were entirely avoidable and regardless of the quite satisfactory monetary result of our operations, we feel there is no reason why a greater profit should not have obtained. We trust our subscribers will continue with renewed effort during the coming season further to reduce these unnecessary losses by close observation for infractions of pilot rules and the rules of your association and, by examination into the details of each accident applying whatever criticism is necessary to avoid a repetition.

"From the opening of the navigating season on April 15 to the finish of the post-season sailings, there have been 133 accidents reported which will result in claims under our certificates. This is slightly in excess of the 1915 record in which 122 accidents were reported. However, in 1915 only a trifle over half of the fleet went into commission at the opening; the balance at intervals up to September, from which we will understand that although there are a greater number of accidents this year, the percentage is less in consideration that all vessels were in commission from the opening of the season.

"In dividing the losses according to the months in which they occurred and in the percentage which each month's loss bears to the whole, we present the following comparison as between 1915 and 1916:

Month.	—1915— Number of accidents.	—1915— Percentage of the whole loss.	—1916— Number of accidents.	—1916— Percentage of the whole loss.
Apr.	7	4.86	12	5.87
May	14	9.03	20	21.43
June	7	4.60	15	6.65
July	10	4.24	14	17.07
Aug.	7	5.95	15	12.06
Sep.	17	23.59	13	7.31
Oct.	20	18.22	23	13.77
Nov.	39	29.51	18	13.47
Dec.	1	Small	3	2.37
	122		133	

"There is quite a noticeable reduction in the percentage of losses in the fall months that is, indeed, gratifying and indicates that more caution is being exercised by our navigators in that portion of the year which is always contended to be the most hazardous. However, we believe this result is proof that with proper precaution and the exercise of good judgment on the part of the navigator and with the assistance of our efficient weather department, there is no reason to assume that sailings during November and December are much more hazardous than in the summer months.

"It was decided to continue in the season of 1916 the reservation of 25 per cent from conventional insurance as in 1913, 1914 and 1915. At the meeting of the advisory committee, held on April 11, 1916, the rate of initial contribution for the current fiscal year was established at 3.25 per cent net, pro rata, being the same as the intial contribution for the fiscal year 1915. The lake time clauses for 1916 were practically the same as in 1915. The association adopted the underwriter's rider providing for post-season sailings and for navigation between April 1, noon, and April 15, midnight, which was found so beneficial to our members in the advantage provided for securing contracts for cargoes that required the sailing of vessels after Nov. 30, midnight. This rider was practically the same as in 1915.

"The rates named by the underwriters were as follows:

Navigation between noon, April 1, to midnight, April 15, pro rata daily navigating rate; sailing after midnight, Nov. 30, warranted sailing on last voyage not later than midnight, Dec. 12, not below Montreal, 1 per cent. For sailings after midnight, Nov. 30, one trip only, not below Montreal: Warranted sailing not later than Dec. 5, ½ per cent; warranted sailing not later than Dec. 8, ¾ per cent; warranted sailing not later than Dec. 12, 1 per cent. Port to port in one lake only; light for the purpose of laying up; sailing not later than Dec. 12, midnight, ¼ per cent. If the vessel is on a voyage at midnight, Nov. 30, and sails again after arrival, the premium hereinabove provided for navigation after that date shall be in addition to the pro rata of season rate provided in the policy.

"In the season of 1916 there was no change in the rules of the association with regard to the eligibility of subscribers. However, there were a great many changes in the ownership of vessels, many of the subscribers being thereby eliminated and others admitted to membership. In the fiscal year of 1916 there were 219 vessels entered in the associate membership of the association. The regular annual dues of $10 per boat were charged to cover their proportion of the expense. The associate membership being amenable to the same rules and regulations as the vessels in the regular membership, were supplied with copies of circulars, *The Bulletin*, and other matters relating to the rules and

Accidents Reported During Sailing Seasons

Nature of accident	Years 1909	1910	1911	1912	1913	1914	1915	1916
Strandings	54	9	14	31	20	18	30	18
Groundings	128	60	42	30	19	21	28	30
Collisions	125	88	66	50	52	15	26	31
Striking obstructions	25	17	8	12	10	2	2	1
Striking locks	5	1	2	2	1	..	..	..
Striking bridges, abutments, docks, breakwaters, buildings, piers, lock-walls, piling, buoy lights, canal walls, harbor and channel banks.	48	40	38	38	30	22	28	35
Fire damage	3	1	4	..	..	1	1	..
Explosions	..	1	..	..	..	..	1	..
Stress of weather	9	2	..	2	4	..	1	2
Machinery damage	12	1	4	1	3	2	..	3
Rudder damage	..	4	5	1	1	..	..	..
Wheel damage	..	4	7	..	..	1	3	8
Bent and broken quadrants	..	1	2	..	..	..	..	..
Boiler damage	2	..	..	..	..	1	..	..
Collapsed decks	2	..	..	..	..	..	..	..
Cargo heating	1	..	..	..	..	..	..	..
Legal expenses	2	..	..	..	..	1	..	..
Lost anchor	1	..	1	..	..	..	..	..
Ice damage	1	..	..	..	1	..	..	1
Salvage Assn. fees	5	..	..	..	..	..	..	..
Unknown	1	..	..	..	..	..	..	..
Broken deck winches	..	..	1	..	..	..	..	..
Loading rig fell on deck	..	..	1	..	..	3	..	..
Broken quadrant and rudder	..	..	..	1	..	..	..	..
Cargo shifted	..	..	..	1	..	..	..	..
Ran over wreck steamer JOLIET	..	..	..	1	..	..	..	..
Lost shoe and rudder	..	..	..	2	..	..	..	1
Flooded: Open sea cock	..	..	..	1	..	..	..	..
Dented plate	..	..	..	1	..	..	..	..
Twisted rudder stock	..	..	..	1	..	..	..	..
Gas explosion	..	..	..	1	..	..	..	..
Personal injuries	..	..	..	..	..	2	..	..
Mooring damage	..	..	..	..	..	3	..	..
Damaged lines	..	..	..	..	..	..	..	2
Total losses	4	6	3	1	9	..	2	1
Totals	428	235	198	177	150	92	122	133

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regulations of the association itself. The successful operation of the association during the past year, is undoubtedly contributed to largely by the associate membership in following the rules and regulations of the association. The navigation of all the ships is made more uniform and the efficiency of the association's corrective influence strengthened correspondingly, and as the associate membership is composed entirely of vessels carrying their own insurance, it is the natural conclusion that the financial success of their venture has been enhanced to a great extent by their membership in the association.

"It is noticeable that the defined inside and outside courses for Lakes Huron and Superior are more generally used each year. However, it was found by observation during the year that there were a number of our vessels not complying with the rules. The matter was considered by the advisory committee at its meeting of July 6, in which it was reported that numerous complaints were being received by the subscribers of unobservance of outside courses for down-bound vessels and inside courses for up-bound vessels on these lakes, making it highly necessary to take immediate and positive action to prevent this dangerous practice and the managers of several fleets voiced their intention to deal severely with any master in their fleet for unobservance of the rules and announced their decision to adopt necessary means to obtain information of all such cases.

Membership and Tonnage During 1916

"As shown in the annual report for the year 1915, there were 163 vessels then in the membership of the association with gross registered tonnage of 779,912 tons. From these the following vessels have been withdrawn during the year 1915-16:

	Gross tons.
John J. Barlum	6,419
Thomas Barlum	5,752
A. E. Stewart	3,943
G. A. Tomlinson	6,361
Wm. B. Davock	4,468
Wisconsin	4,858
J. M. Jenks	4,644
Bransford	4,657
Edwin F. Holmes	4,787
Umbria	4,803
H. B. Hawgood	4,655
John Sharples	1,614
Maryland	2,419
J. H. Wade	1,863
Total tonnage	61,243
The steamer Western Star, lost in 1915, was declared a total loss early in 1916	4,764
Total tonnage deducted from the membership to the close of the fiscal year of 1915-16	66,007

"The following 25 steel steamers were admitted to the membership in the fiscal year of 1916:

	Gross tons.
W. W. Brown	3,582
A. G. Brower	3,582
Wm. T. Roberts	6,359
Charlotte G. Breitung	3,452
J. K. Dimmick	4,651
Livingstone	2,134
Frank T. Heffelfinger	4,897
Frederick B. Wells	4,897
George W. Peavey	4,997
Frank H. Peavey	5,002
John Owen	2,127
Wm. Livingstone	6,634
Harvey D. Goulder	6,617
City of Bangor	4,202
Penobscot	4,077
E. C. Pope	2,637
Munising	4,309
Negaunee	4,305
Steel King	4,308
J. H. Bartow	6,316
Luzon	3,582
Panay	3,811
Fred G. Hartwell	6,223
Harry A. Berwind	6,634
Charles L. Hutchinson	6,377
Total tonnage	115,712

"Also there have been added two newly constructed steel steamers, as follows:

	Gross tons.
Emory L. Ford	7,986
Herbert F. Black	6,262
Total tonnage added to membership in the fiscal year of 1916	129,960
George C. Howe	1,550
John Lambert	1,550
A. D. Davidson	1,640
J. S. Keefe	1,640
Albert M. Marshall	1,640
S. N. Parent	1,640
Robert Wallace	1,640
H. G. Dalton	1,614
America	2,171
Brazil	2,186
Total	28,719
In addition there has been one total loss:	
S. R. Kirby	2,338
Total	31,057

"Making a total of 159 vessels with total gross registered tonnage of 812,808 tons active Jan. 1, 1917.

American Bureau Elects

The annual meeting of the American Bureau of Shipping was held on Jan. 23, 1917. The president and officers were agreeably surprised and pleased with the large number attending the meeting. During the meeting, the president offered his report on the progress of the Bureau since his inception as president. The report clearly evidenced the fact of the Bureau's rejuvenation. It met with the enthusiastic approval of both the executive committee and the general membership of the Bureau. It appeared to fully justify the confidence of the members and managers in the Bureau and from the bright outlook assures this, the only American classification society, an auspicious future. The report of the operation of the Great Lakes department was also a source of gratification to the managers of the bureau.

George J. Baldwin, Louis F. Burke and N. de Taube were elected to the board of managers. Louis F. Burke was also elected a vice president of the Bureau. Following are the officers elected for the ensuing year: President, Stevenson Taylor, New York; vice presidents, Antonio C. Pessano, Frank Gair Macomber, William H. Todd and Louis F. Burke; secretary and treasurer, John W. Cantillion.

1916 Financial Operations

PROTECTIVE ASSOCIATION'S STATEMENT (APPROXIMATE.)

Navigating contributions to Dec. 1, 1916			$304,453.08
Early port risks			1,708.63
Extensions into port			2,222.71
Post season trips			48,156.02
Interest on deferred payments of contributions			28.14
Interest from depositories			3,113.59
			$359,682.17
Less returns on certificates:			
Cancelled certificates	$2,237.48		
Lay-up returns	110.87		
			$2,348.35
Funds to pay losses and expenses			$357,333.82
Expenses of the association to Nov. 30, 1916, estimated on pro rata of the year's expenses. (Actual expenses, $26,230.25)		$28,741.00	
Claims paid to date	$49,636.03		
Claims adjusted, but not paid	1,288.27		
Claims expected, estimated	113,007.00		
		$163,931.30	
			$192,672.30
Or indicating a surplus of			$164,661.52

Equal to 46.085 per cent of the net contributions.

"Leaving 175 vessels active in the membership of the association for the fiscal year of 1916, divided as follows:

	Gross tons.
162 steel steamers	813,387
5 steel barges	13,291
5 composite steamers	10,539
2 wooden barges	4,811
1 wooden steamer	1,837
175 Totals	843,865

"The above tonnage statement includes all vessels comprising the membership for the fiscal year 1916 and which tonnage is entitled to representation in matters concerning the association's business for that fiscal year. During the calendar year 1916, however, the certificates on the following vessels have been permitted to be cancelled by the advisory committee and their contribution adjusted pro rata to cover the period of active participation:

	Gross tons.
Lackawanna	2,015
Selwyn Eddy	2,846
Harvey H. Brown	2,673
Corsica	2,364
John Crerar	1,550

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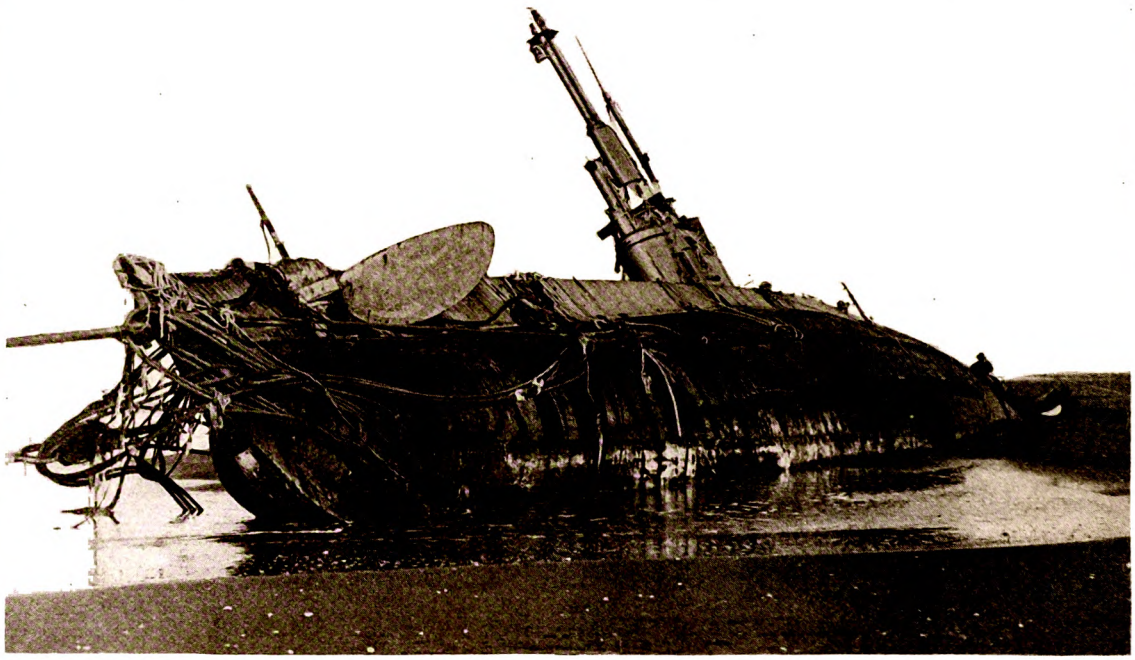
Latest Marine News in Pictures

Payment Will Be Made For Acceptable Photographs



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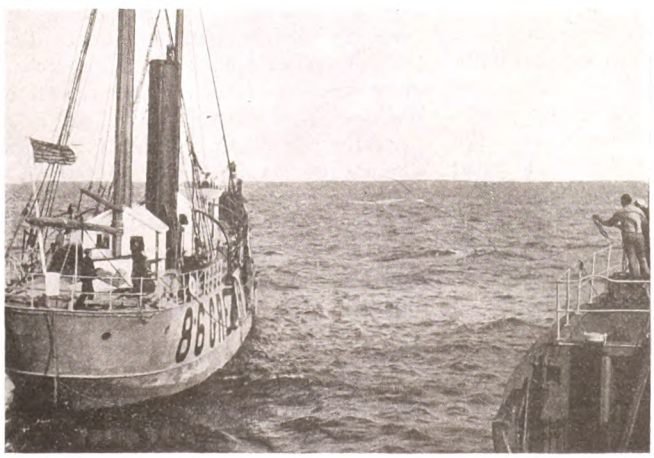
The lightship service of the United States government, one of the oldest branches of federal activity, is seldom before the public eye. The work of the crews of these floating lights is not often spectacular, but should any one man fail in the performance of his duty, the lives of thousands might be jeopardized. For weeks at a time these lightships are isolated from the mainland. At periodic intervals a supply ship calls on its rounds, leaving food, new equipment, supplies of a varied nature, newspapers and mail. Save for these visits, always looked forward to by the crew, communication with the outside world was, until the universal adoption of the wireless, entirely cut off. In the smaller illustrations on this and the opposite page, several of the lightships off the treacherous New England coast are shown. Vineyard light, 90, in Vineyard sound, shows two fixed red lights of 300 candlepower, which are visible for 11 miles; the Pollock Rip Shoals lightship, in Nantucket sound, shows two fixed red lights of 100 candlepower, which are visible for eight miles. The lightship displaying the white panel with the word Relief in black letters, is an emergency ship, taking the position of a regular lightship which has been removed for repairs. Not only does the supply ship make regular rounds to the lightships, but she also maintains a rigid inspection of light buoys. In one of the accompanying illustrations the captain of the supply ship may be seen returning from an inspection of a distinctly intimate and personal nature.



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Photographs From Far and Near

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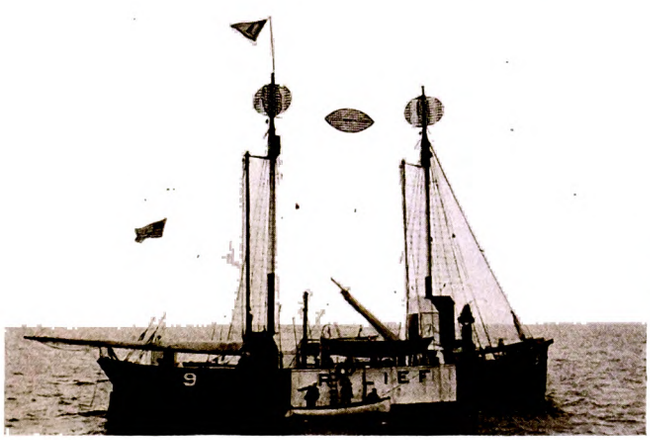
On the night of Jan. 13, during a heavy gale, the U. S. S. MILWAUKEE, *an armored cruiser of the Pacific reserve fleet, went ashore near Eureka, Cal., the scene of many disastrous and historic wrecks.* MILWAUKEE, *summoned from San Diego, Cal., shortly after the beaching of U. S. S.* H-3, *a submarine, driven ashore by a heavy storm Dec.* 14, *had a* 24*-ton hawser about the hull of the wrecked submersible.* MILWAUKEE *was lying about ½ mile off shore in company with the U. S. S.* CHEYENNE, *monitor, and the U. S. S.* IROQUOIS, *navy tug. To counteract the tide rip and the treacherous currents,* CHEYENNE *and* IROQUOIS *both had steel hawsers aboard* MILWAUKEE *to keep her from drifting ashore. During the night* CHEYENNE'S *cable snapped. The sturdy tug hung onto the drifting* MILWAUKEE *until the roar of the breakers sounded above the din of the storm and then gave up the unequal battle by cutting her cable.* MILWAUKEE, *unable to maneuver rapidly in the heavy sea, failed to slip the heavy steel hawser anchored to the beached submersible and was soon aground. All night long the heavy combers pounded the ship, and when morning came, a dense fog prevented the Humboldt bay coast guard from effecting a rescue. Shortly before noon* 421 *men and* 18 *officers were taken off the ship by means of the breeches buoys, and the* $4,000,000 MILWAUKEE, *the one-time favorite of the late Admiral Dewey, lay a deserted wreck on the California coast.* MILWAUKEE *was authorized by congress in* 1900 *and launched by the Union Iron Works Co., the builder, in* 1905.



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Take Up Pure Water Problem Again

Vessel Owners of Great Lakes Attack Problem Vigorously Following Ruling by Government Bureau—Health Record on Lake Vessels Has Been Excellent

THE problem of furnishing pure water to the crews of vessels on the Great Lakes —a problem that has been given the careful attention of vessel owners and managers for years—has assumed renewed importance during the past few weeks. The bureau of public health service, through the surgeon in charge of the sanitary district of the lakes, announced a few weeks ago that "no boat will be permitted to leave port at the opening of navigation next spring without one of the approved methods of water purification being installed".

This ruling, if interpreted literally, is practically certain to result in considerable confusion and delay next spring. The surgeon in charge of the Great Lakes district has asserted emphatically that the ruling will be enforced. But the practically impossibility, as it seems now, of equipping the entire lake fleet during the next 10 to 12 weeks with water purifiers will require some modification of the ruling unless irreparable damage is caused to one of the country's greatest industries—damage that would be quickly felt by the iron and steel manufacturers, coal companies and grain shippers. In fact, the Washington representative of *The Marine Review* has already learned from Surgeon General Blue, in charge of the public health service, that while the bureau set a limit of May 1, it was disposed to give the lake interests "a little time".

The problem is being attacked with characteristic vigor by the owners of vessels operating on the Great Lakes. Although many owners feel that the ruling is arbitrary and uncalled for—and they point out the almost perfect health record set last year—they are going ahead with their plans to secure purifiers and are arranging to install them on the ships of their fleets as quickly as the manufacturers of these purifiers can arrange to make delivery.

TAKING as an example the vessels of members of the Lake Carriers' Association, investigation shows that in 1916 there were three cases of typhoid fever, one of scarlet fever, one of diphtheria and one of smallpox on board these ships, and in each case it was found that the disease had been contracted ashore and brought aboard the ship. The number of sailors in service was at a maximum last season, as every vessel was in commission throughout the year. Despite this fact, however, the health record, as far as contagious or infectious diseases are concerned, was almost perfect.

The results obtained by the Lake Carriers' Association last year in conserving and protecting the health of the crews on board its ships are convincing evidence of the thoughtful attention that vessel owners on the lakes have given for some years to this question of pure water.

The lake interests, however, have shown no disposition to question the ruling, and for several weeks every effort has been made to investigate the problem thoroughly and to decide upon and hasten the delivery of water purifiers for early installation on the boats.

The first step taken, after notification had been received by the Lake Carriers' Association of the new ruling, was the appointment of a committee of engineers to study the problem. This committee was headed by Frank B. Smith, chief engineer of the Pittsburgh Steamship Co. This committee first held a conference with Dr. J. O. Cobb, the surgeon in charge of the Great Lakes district for the public health service, and H. P. Letton, sanitary engineer for the government. Later, conferences were held with representatives of manufacturers of water purifiers. The committee reported at the annual meeting of the Lake Carriers' Association at Detroit, Jan. 18, and laid before the members the results of these conferences.

The response by the members of the association was prompt. President Livingstone had just finished reading his annual report in which was outlined the wonderful health record set on the boats last season, and the measures that had been pursued by the association throughout the season in insuring full compliance with the association's suggested health safeguards. Nevertheless, the members voted unanimously to authorize the president to appoint a committee to consider the question of installing water purification systems.

This committee was appointed a few days later, being composed of E. C. Collins, W. P. Schaufele, George M. Steinbrenner, C. J. Peck, A. W. Thomson, W. D. Becker, A. E. R. Schneider, J. B. Ayers, C. C. Canfield, W. C. Richardson, W. H. McGean and G. A. Tomlinson. This committee met Jan. 26 with the committee of fleet engineers, and with representatives of the water purifier manufacturers. As a result of the deliberations, Mr. Smith was appointed chairman of a small committee to investigate the actual operation of a number of the purifiers.

Serious consideration was given by the committee of engineers to three methods of water purification, distillation, heating with a steam jet, and the ultraviolet rays.

Assistance was given to the committees by C. Arthur Brown, chief en-

The Text Today Is---

Why beholdeth thou the mote that is in thy brother's eye, that considers not the beam that is in thine own eye. Matthew vii, 1.

The solicitude felt by the government for the sailors on privately owned boats was not due, as one might expect, to the results the government has secured on its own ships. In fact, the necessity for correcting the condition of the drinking and cooking water used on privately owned lake vessels has apparently so engrossed the attention of the government officers, that they have not had time to think of their own boats. When federal officials at lake ports and at Washington were asked by representatives of The Marine Review to explain just what systems of water purification had given the best satisfaction in actual use on government lake boats, these officials were surprised. Either the subject had not been considered, or the number of boats was too small, or the vessels were under the authority of another department, or they had no authority. Anyway, they say the privately owned boats must observe the pure-water ruling, and the question of safeguarding the sailors on government boats would be taken up later.

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gineer of the engineering bureau of water purification of the United States Steel Corporation. Mr. Brown has had an unusually wide experience in the operation of water purification systems.

At the meeting of the special committee and the committee of engineers, Mr. Brown discussed at length the problem of securing pure water in the quantities desired on lake vessels. He stated that it would probably be found that over a long period, two pounds of steam would be required to one pound of distilled water. This statement was made in reply to questions by those anxious to inform themselves as to the adaptability of their present equipment in taking care of the added load.

It was brought out at the meeting that about 300 gallons of water would be needed daily to take care of a freighter's drinking and cooking water requirements. A supply of water, however, will probably be stored up, as is now the general practice, when the boat is passing through one of the "safety zones". Most of the purifiers are designed to handle water from any source, regardless of the degree of pollution, but for sentimental reasons, the water will probably be taken aboard while the boat is traversing these "safety zones" rather than in harbors, rivers, or areas known to be polluted.

A report recently prepared by Dr. Cobb, Mr. Letton and Dr. C. L. Williams, is published elsewhere in this issue. This report discusses at length the problem of water purification on board lake vessels and gives the results of tests conducted on water used on some of the boats.

Inquiry by the Washington representative of *The Marine Review* has disclosed that the installation and inspection of the water purification systems will be under the charge of the bureau of public health service.

Where Washington Officials Stand on Pure-Water Problem

The Washington correspondent of The Marine Review learned through Surgeon General Blue of the bureau of public health service

That—

The ruling by Dr. Cobb requiring all lake vessels to be equipped with water purification systems before these boats can leave port, will be enforced by the government.

The water purifying apparatus will not only be inspected under the direction of Dr. Cobb, as representing the sanitary district of the lakes, but supervision of the apparatus will come under his jurisdiction.

He upholds Dr. Cobb in his contention that vessel interests have had time to equip their vessels, but, he added, in any event, "the bureau of public health service is willing to give them time."

This ruling takes effect at the opening of navigation this year.

The government intends to equip its lake ships with the same apparatus required on privately owned ships.

Disease Stamped Out On Lake Vessels

THE recent action of the government surgeon in charge of the Great Lakes district in ruling that water purification systems must be installed on lake vessels was a surprise to the vessel owners, who for many years have waged a wonderfully successful campaign against contagious and infectious diseases. On the 414 vessels of the Lake Carriers' Association, for instance, not a single epidemic of contagious or infectious disease broke out aboard ship in 1916—a year in which every ship was in commission and the number of men employed was at a maximum.

The subject of pure water and of proper sanitary conditions has been carefully considered by the vessel owners for many years past, and energetic measures had been adopted to improve conditions aboard ship. The result has been to raise the level of health among lake sailors to a point far above that reached by most cities.

The Lake Carriers' Association, in its annual report made public a few days ago, points out that on its ships in 1916, "there were three cases of typhoid fever, another of scarlet fever, one of diphtheria, and one of smallpox. In each instance the disease was brought aboard the vessel but was stamped out without having made progress. More than that, not a single death occurred on the vessels from contagious or infectious disease, the deaths that occurred having been from diseases of organic origin. These facts tell better than words the vigilance of the sanitation committee in safeguarding the vessels against disease, and of insisting upon cleanliness in every department of the ship. The campaign was directed mainly toward insuring pure drinking water, milk, ice and foodstuffs, and the men were cautioned in the matter of personal care as the safest means of protecting the health.

Safeguarding Drinking Water

"The sick records for the year disclose the fact that there were only three cases of typhoid fever aboard ship during the sailing season, each case on a different vessel. None of the cases had a fatal result. Moreover, the reports indicate very few cases of mild attacks of sickness which might be traceable to water. Combining this with the further fact that last summer was unusual and was characterized by a prolonged period of intense heat, a condition that called for excessive use of water, no higher testimonial of the purity of the drinking water—as it now is aboard ship—could be expected than that furnished by the experience last year.

"Not the least improvement in the way of sanitary efficiency has been that which marked the care of food supplies furnished to the fleet. Three years ago, and again two years ago, the welfare committee urged the dealers to exercise the utmost caution in the handling of food supplies and impressed upon them that in their care largely depends the health and well-being of the men aboard ship, but these appeals did not deter the committee last spring from renewing the subject as vigorously as ever before. One year ago a marked improvement in the manner in which the supply stores handled meat and provisions was noticeable, and to the credit of the dealers it can be stated that a still further improvement was made in 1916. Reports of the stores indicate a higher standard of sanitary conditions and better handling last year and masters have reported a decided improvement in the supplies as they came aboard the vessels. The welfare plan committee has urged upon the dealers the necessity of personal cleanliness among the clerks; the necessity for absolute cleanliness of the store, the receptacles and the vehicles of delivery. They were urged to protect food from flies and dust, to eradicate rats, mice and vermin, to be sure of their milk; that fruits and vegetables should obviously be kept under a cover, and suggestions were given for a sanitary handling of meats and ice."

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Pure Water on Interstate Carriers

A Study of Conditions on Steam Vessels Engaged in Interstate Commerce in the Sanitary District of the Great Lakes

By J. O. Cobb, C. L. Williams and H. P. Leiton

THE fact that contaminated drinking-water supplies on board lake carriers cause a marked increase in the typhoid rate among sailors was first pointed out by Cobb, in 1909, at which time he outlined the various arrangements for obtaining drinking water on board vessels, and briefly discussed the methods of contamination.

In 1910 Young reported an investigation of typhoid fever among the members of crews of lake vessels. In this study he pointed out that the incidence of typhoid fever was higher among seamen on the Great Lakes than among seamen on inland rivers and the sea-coast, concluding also from his statistics that the rate was considerably higher than in lake cities and that the water supplies of the vessels were in many cases contaminated.

De Valin, in 1914, made an epidemiological study of typhoid-fever epidemics on two lake vessels, and in connection with this discussed the question of water supply and sewage disposal somewhat in detail, outlining in a general way possible methods of solution.

In 1909 Young and Judson suggested that the interstate quarantine regulations might be amended so as to control the disposition of sewage from lake vessels. Active corrective measures were not undertaken at the time, but in 1913 the interstate quarantine regulations were so amended as to put the control of drinking-water supplies aboard interstate common carriers under the supervision of the public health service. Other amendments were subsequently made. At the present time the following regulations relate to the water supplies of interstate common carriers:

REVISED INTERSTATE QUARANTINE REGULATIONS

Sec. 13. Water provided by common carriers on cars, vessels, or vehicles operated in interstate traffic for the use of passengers shall be furnished under the following conditions:

(*a*) Water shall be certified by the interstate sanitary officers or the state or other health authorities within whose jurisdiction it is obtained as conforming to the standard of purity of drinking water supplied to the public by common carriers engaged in interstate traffic, as promulgated by the secretary of the treasury on Oct. 21, 1914: *Provided,* That water in regard to the safety of which a reasonable doubt exists may be used if the same has been treated in such manner as to render it incapable of conveying disease, and the fact of such treatment is certified by the aforesaid health officer.

(*b*) Ice used for cooling such water shall be clear natural ice, or ice made from distilled water or water certified as aforesaid, and before the ice is placed in the water it shall be first carefully washed with water of known safety and handled in such manner as to prevent its becoming contaminated by the organisms of infectious or contagious diseases: *Provided,* That the foregoing shall not apply to ice which does not come in contact with the water which is to be cooled.

(*c*) Water containers shall be cleansed at least once in each week that they are in operation.

Sec. 14. Common carriers while engaging in interstate traffic shall not furnish to their crews or employes any polluted water for drinking purposes which may contain organisms or materials likely to cause a contagious or infectious disease, nor shall such carriers maintain or permit to be maintained upon their vessels or vehicles, or at or near their stations or other ordinary stopping places over which they have control, any tank, cistern, receptacle, hydrant, or article with water which may contain such impurities, in such manner that water therefrom may be conveniently obtained by the crews and employes mentioned for drinking purposes, unless such common carriers maintain a notice upon said vessels or vehicles and at, near, or upon every said tank, cistern, receptacle, hydrant, pump, well, stream, brook, pool, ditch, or other place or article, with water therein containing such impurities, forbidding the use of such water for drinking purposes by the crews or employes of the said common carriers or by the general public while engaging in interstate commerce.

Sec. 15. No person, firm, or corporation shall furnish water for drinking or cooking purposes to any vessel in any harbor of the United States intending to clear for some port within some other state or territory of the United States, or the District of Columbia, taken from the waters of such harbor or from any other place where it has been or may have been contaminated by sewer discharges: *Provided,* That water in regard to the safety of which a reasonable doubt exists may be used if the same has been treated in such manner as to render it incapable of conveying disease, and the fact of such treatment is certified by the interstate sanitary officer, or the state or other health authority within whose jurisdiction it is obtained.

Sec. 16. Common carriers operating vessels in commerce between the several states and territories or the District of Columbia, for passengers in interstate traffic, shall not supply for the use of said passengers any water taken from a lake or stream over which the vessel is being navigated unless the same is certified by the United States public health service or the state or municipal health authority within whose jurisdiction it is obtained as conforming to the bacteriological standard for drinking water promulgated by the secretary of the treasury under date of Oct. 21, 1914: *Provided,* That water in regard to the safety of which a reasonable doubt exists may be used if the same has been treated in such manner as to render it incapable of conveying disease, and the fact of such treatment is certified by the aforesaid health authority or by the surgeon general of the United States public health service or his accredited representative.

Following the promulgation of the above-quoted interstate quarantine regulations and in order to facilitate their enforcement, the continental United States was divided into 12 districts known as interstate sanitary districts. The district of the Great Lakes embraces that portion of the United States lying north of a line beginning at the junction of the seventy-fourth degree of longitude and the Canadian line, and extending south to the forty-second degree of latitude, west to the seventy-eighth degree of longitude, south to the fortieth degree of latitude, west to the ninetieth degree of longitude, north to the forty-sixth degree of latitude, west to the ninety-third degree of longitude, and north to the Canadian line.

The above-described district embraces parts of the states of New York, Pennsylvania, West Virginia, Ohio, Indiana, Illinois, Wisconsin, Minnesota, and the entire state of Michigan, as shown in Fig. 6. The headquarters and laboratory for this district are at the United States Marine Hospital, 4141 Clarendon avenue, Chicago. During the past summer, inspections were made and samples collected from most of the passenger vessels and from some freight vessels on the Great Lakes, the scope of this work being outlined below.

Present Method of Obtaining Drinking Water on Lake Vessels

Of the two general methods of obtaining drinking water on board lake vessels, the first and most common is by pumping, or by gravity, through a sea cock in the hull of the vessel, and the second by filling the drinking water tanks through a hose from a hydrant on shore.

Sea Cocks.—A sea cock consists generally of a flanged valve bolted directly to the shell of the vessel, the water entering the cock through numerous small holes piercing the shell. These holes act at a strainer to prevent solid matter entering the valve. The cocks vary in size from 2 to 10 inches, and are usually placed at a depth of about 8 feet below the water level.

From the sea cock the water is distributed by several methods. In a great many cases the storage tanks are located below the water line, and it is possible to fill them by gravity directly from the sea cock. In other cases the water is pumped into the tanks by the general service pump. A few vessels are equipped with special pumps which are used only for handling fresh water, and on these vessels the tanks are filled with this pump. In the first and last methods it is quite common to find special sea cocks used only for taking in the drinking-water supply. In a number of cases, however, the tanks are filled

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by gravity from the general service sea cock.

Drinking-Water Storage Tanks.—The drinking-water storage tanks are usually cylindrical in shape, varying from 3 to 5 feet in diameter, and from 10 to 20 feet in length, and are constructed of heavy galvanized iron or sheet steel. In a few cases, tanks are built in the fantail of the vessel by placing a bulkhead across the ship and allowing the hull to form part of the tank. Such construction is faulty, difficult of access, and in many cases potentially subject to contamination. In two tanks of this type, soil pipes from water closets were found to pass through the tanks, the outlets being bolted to the hull plates. In one of these latter tanks, there was also found to be leakage around the rudder post with consequent contamination. The cover of these tanks consisted of wooden decking, which in some cases was rotted, allowing leakage from nearby poorly kept urinals. These conditions were corrected without delay.

Very few tanks are lined, though sometimes they are coated with "bitumastic enamel", or are given a wash coat of neat cement.

The water of the Great Lakes contains very little sediment, and hence it is unnecessary physically to clean the tanks except at very long intervals. During the summer, pending our investigations, directions were given several freight vessels for disinfecting the tanks with hypochlorite at intervals for the remainder of the season, in lieu of having a man go inside the tank and scrub it, which would most likely increase the contamination rather than lessen it.

Distributing Systems.—On most vessels there are two, and in some cases three, systems of water supply: First, the fresh or drinking water which supplies drinking fountains, kitchens and washbasins; second, the so-called "sanitary" system, which furnishes the water for flushing toilets; third, the fire system, which is also often used for washing down decks and other purposes. As far as sanitary significance goes, the drinking-water system is the only one under consideration.

This water is distributed either by gravity from a storage tank located on an upper deck or by a special distributing pump which maintains a constant pressure in the system. When the tanks are filled by gravity from the sea cock there is always a special distributing pump which takes the water from the tanks, as shown in Fig. 2.

When the tanks are filled by the general service pump the water is either distributed by gravity or by a special pump, as shown in Fig. 4. When a special pump is used for filling the tanks the water is usually distributed by this same pump, although in some cases it may supply a tank on the upper deck from which the water is distributed by gravity, as shown in Fig. 3.

The greatest opportunity for the contamination of the drinking-water supply occurs when the tanks are filled by the general service pump. It is customary for the general service pump to be used in port for washing down decks, and upon leaving port for "shooting" ashes, after which the drinking-water tanks are filled, the idea being that during the time taken for "shooting" ashes the sea cock, suction pipe, and manifold are thoroughly cleansed by the force of this flushing. Inasmuch, however, as on some vessels the suction pipe is 8 inches in diameter and 50 feet long, besides containing numerous bends, it is obvious that there is a considerable opportunity for polluting matter to remain in this pipe, even after running the pump in clean water for some time (see Fig. 5.)

Government's Viewpoint

The accompanying article comprises liberal extracts from a report published recently by the United States public health service. It is a study, made by the public health service, of conditions on steam vessels engaged in interstate commerce in the sanitary district of the Great Lakes. The authors are all affiliated with this service, Dr. Cobb being surgeon in charge of the Great Lakes district, Dr. Williams an assistant surgeon, and Mr. Letton sanitary engineer. It was Dr. Cobb who announced recently that all lake vessels must install a method of water purification before navigation opens this spring.

Where a special pump is used for filling the tanks, water is pumped through the sea cock only when the vessel is well out in the lake. In a great many cases, however, the sea cock itself is left open all the time, and a valve on the suction line near the pump is opened or closed as water is taken in. This means that the suction line is filled with water at all times. Therefore, when the vessel is lying in port the water in the suction line becomes contaminated. The location of the docks at practically every port on the Great Lakes is such that the vessels lie in very badly polluted water. At Chicago a majority of the boats tie up in the Chicago river below the outlets of several large sewers. At Milwaukee the docks are on the Milwaukee river, which contains an excessive amount of sewage pollution, being, in fact, "septic" most of the time. At Buffalo the docks are on the Buffalo river, where the conditions are worse than at Milwaukee. At Detroit the docks are along the Detroit river and closely adjacent to many large sewer outfalls. At Cleveland some vessels still dock in Cuyahoga river, which is always "septic". The Detroit & Cleveland Navigation Co. and the Cleveland & Buffalo Transit Co., which enter Cleveland, dock at a new pier inside the breakwater, but the water at this point is also contaminated.

On some vessels, in order to protect the drinking-water supply from pollution of this kind, a valve has been placed on the suction line about 3 feet from the fresh-water sea cock, and between this valve and the sea cock a small drain pipe is tapped, controlled by another valve. When not pumping through the sea cock, both the sea cock and the extra valve are closed and the small drain pipe is opened. This prevents the entrance of any contaminated harbor water, since even if the sea cock leaks the leakage will drain out into the bilge through the small open valve.

By reference to the diagrammatic sketches, Figs. 2, 3 and 4, the general scheme of obtaining water as outlined above can be seen.

On some vessels where drinking water is distributed from an upper deck tank by gravity this tank is connected directly to the pump by a pipe, or the tank is filled from a hose, as shown in Fig. 4. This arrangement is preferable, because there is no possibility of water being pumped into the drinking-water tank except when it is specifically intended to do so. That this matter is important is borne out by the fact that at times, through negligence, water is pumped into the tanks when lying at dock, because the system of opening up the pipe line to the drinking-water tanks when the vessel is passing through a zone of uncontaminated lake water carries with it the possibility, even the probability, of carelessness and forgetfulness in leaving open the valve after the vessel has entered polluted water. It has been stated that a number of times these valves have been left open and the pump has been kept running after vessels had entered the Chicago and Milwaukee rivers. Employes aboard lake carriers are just as liable to forget as other persons. That this particular act is ever intentional is unlikely, but there is reason for the belief that this accident has happened a number of times. One of the writers (Letton) during the past season

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while inspecting a vessel found the gravity tank filled with polluted Chicago river water because of the carelessness of the watchman in opening the valve leading to the tank while washing down decks. And even if the duty of collecting drinking water is performed with vigilance, such care can be, and most likely often is, nullified by leaky valves, the defects of which cannot be detected except by means of the drip valve described above.

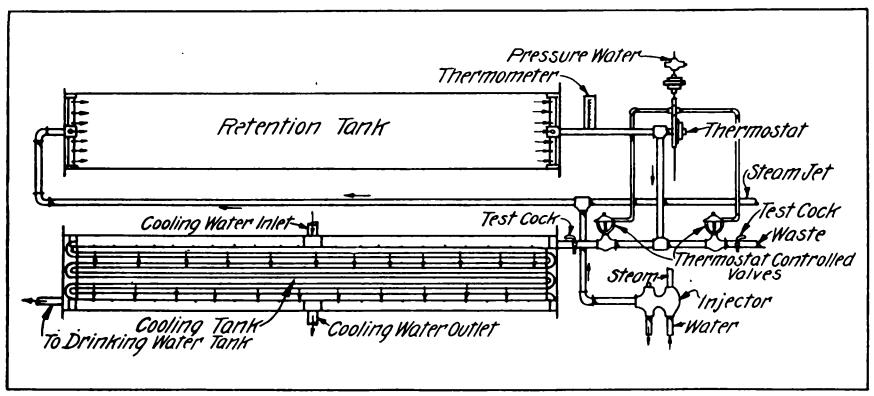

FIG. 1—DRAWING OF APPARATUS FOR DISINFECTING WATER BY STEAM JET, EQUIPPED WITH DEVICES TO MAKE IT AUTOMATIC AND FOOLPROOF IN OPERATION

Filling Tanks from Shore.—When drinking-water tanks are filled from shore, this is done either by carrying the water through a fire hose directly from the hydrant to the tank or by connecting the hose to the distribution system. In most cases vessels that fill their tanks from shore have the pipe systems so arranged that they can also fill through a sea cock directly from the lake, protecting this line from contamination with the valves and drip pipe previously described. As a further protection on some vessels the wheels for operating the valves are removed, so that there will be no accidental opening of this connection.

Opportunities for Contamination.—The opportunities for contaminating the drinking water aboard lake carriers are as follows:

1. Contamination of sea cock or suction pipe while lying in polluted water, due to faulty seating of valves, failure to close valves, or the use of a general service pump.

2. Since in most of the vessels the engine rooms and sea cocks are aft of amidships and since there is usually more or less sewage discharged from toilets in the forward part of the boat, it is possible that some of this fecal matter discharged from the bow is sucked in through the sea cock.

3. Accidental or intentional taking of supplies near shore or in unsafe waters. This may occur when the vessel never goes far from shore, as in running between Chicago and Milwaukee, or when it is in clean water for too short a time to fill its tanks. This situation is aggravated by the fact that the engineer in the engine room cannot tell at all times exactly where the vessel is; also by the fact that many ship captains and engineers are not acquainted with all the places where it is unsafe to take water. There is also the likelihood that engineers and other employes may forget to close the sea cock as the vessel approaches a polluted harbor.

4. There is also more or less possibility of picking up sewage in the wake of other vessels, as for example where one vessel is towing another. That this method of contamination is a real one has been brought out by testimony before the international joint commission on remedies for the pollution of boundary waters between the United States and Canada.

Summary.—As a result of the statements made above regarding the taking of a ship's drinking-water supply from the Great Lakes, it is obvious that it is an impossibility for any vessel operating on the Great Lakes, using the methods at present in vogue, to obtain a drinking water which shall be at all times free from contamination.

It is, therefore, necessary, in order always to furnish a safe water for drinking purposes, that each vessel shall install some suitable form of water-purification apparatus. Some vessels have already made such attempts.

Present Methods of Treating Water on Board Lake Vessels

Filtration.—The attempt at water purification most commonly found in use on vessels on the Great Lakes is filtration through small rapid sand filters, there being about 30 vessels using filters of this kind. These filters are used either as the sole means of treatment or as a preliminary step in some other process of purification. The filters vary in size from 10 to 60 inches in diameter. Each filter is equipped with a shunt feed box for adding aluminum sulphate to the water before filtration.

On two vessels there are sand filters of a type somewhat different from that described above. In this apparatus the water first passes between a series of iron plates so connected with an electric current as to form electrodes. The action of this electrode box is to cause a precipitation of iron hydrate, which is a good coagulant and one easy to remove by filtration. From the electrode box the water passes to a small coagulating chamber, where some time is given for the coagulant to collect and partly settle. From this coagulating chamber the water passes through two small rapid sand pressure filters, connected in series. The apparatus is arranged to act automatically, so that the electric current is on only when water is being drawn through the system. It is so designed that the filters can be washed one at a time, the wash water being furnished by the filter in operation.

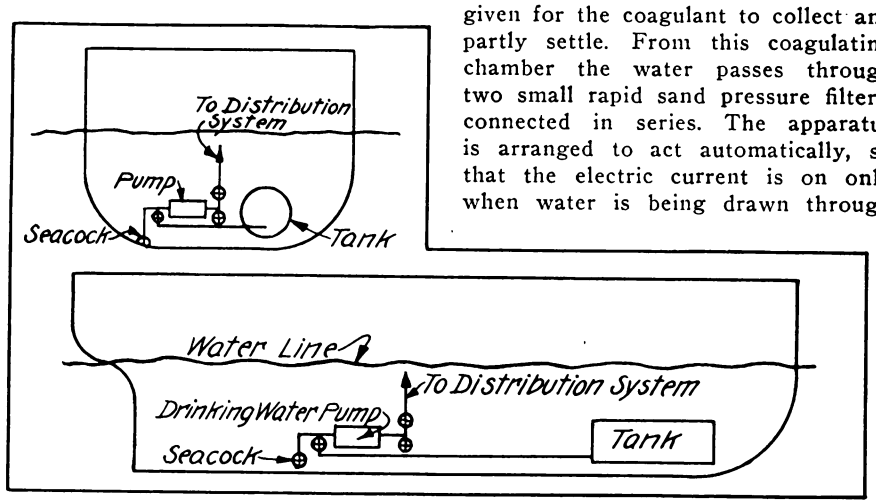

FIG. 2—TANK FILLED FROM SEACOCK BY GRAVITY OR BY SPECIAL DRINKING-WATER PUMP. WATER DISTRIBUTED BY SPECIAL DRINKING-WATER PUMP

Ultraviolet Ray Sterilization.—Thirteen

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boats operating during the past season were equipped with apparatus for sterilizing their drinking water by ultraviolet rays. Eleven of these vessels used a "pressure-type" apparatus and two a "gravity-type". The pressure type of apparatus consists of a cast iron cylindrical shell, with a quartz tube through its axis and containing baffle plates so arranged as to spread the water in a thin film while passing through the ultraviolet field. The ultraviolet lamp in use during the summer of 1915 was a quartz lamp of the "pistol" type, which was inserted on the inside of the quartz tube. In the gravity type of apparatus the lamp is suspended above a baffled treatment chamber, where the water is exposed in a thin film twice during its passage by the lamp. The gravity apparatus had only a capacity of about 100 gallons an hour, which is considerably below the maximum amount needed on most lake vessels, and as a result it was used solely for filling water bottles, pitchers, etc. The pressure apparatus, on the other hand, was rated either at 200 or 1,000 gallons an hour, and the water was treated while under pressure on its way to the distribution system.

The ultraviolet type of sterilizing apparatus early attracted our attention. The results of laboratory examinations demonstrated that the apparatus in the form described was inefficient. The company manufacturing the apparatus at once set to work to remedy the obvious defects. They have equipped a new type of lamp with an automatic device for relighting whenever it goes out because of breaks in the current. It is claimed that this new lamp emits a higher per cent of ultraviolet rays, and that it will stand a much greater fluctuation in voltage than the old type without going out. The company has also developed an arrangement whereby the water will be shut off automatically when the lamp is out and remain so until it is relighted and regains its point of maximum efficiency, when the water is again started automatically.

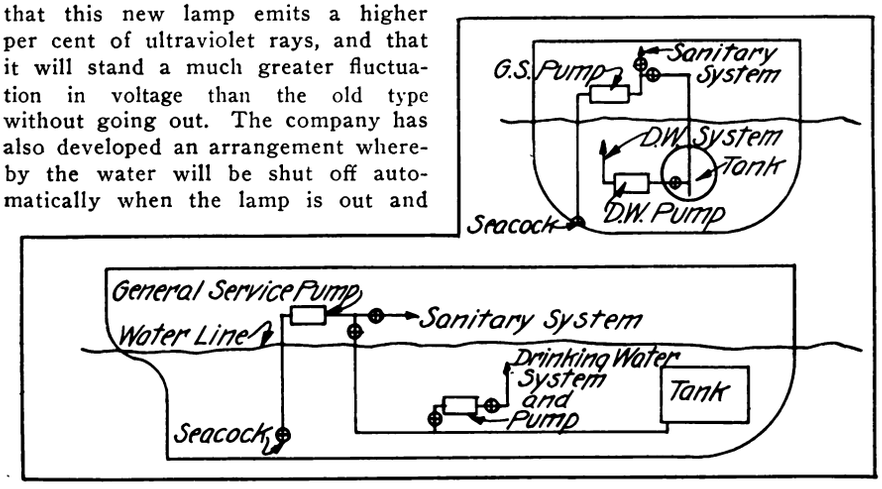

FIG. 3—TANK FILLED FROM SEACOCK BY GENERAL SERVICE PUMP. DRINKING WATER DISTRIBUTED BY SPECIAL PUMP

Chlorine Disinfection.—The water supply of five vessels was treated with calcium hypochlorite, a small dose of a solution of this chemical being added to the storage tank each time it was filled. Calcium hypochlorite, a very efficient sterilizing agent when properly administered, is not to be recommended on vessels for the reason that it depends for its constant efficiency upon some person to correctly proportion the dosage added to the tanks each time they are filled. On one of the vessels using this chemical the water, at the time of inspection, had an extremely strong chlorinous taste. This indicated an overdose, and was evidence that there was no close control of the amount added. This method is further open to the criticism that its uniform efficiency rests entirely upon human agency, which can never be wholly dependable.

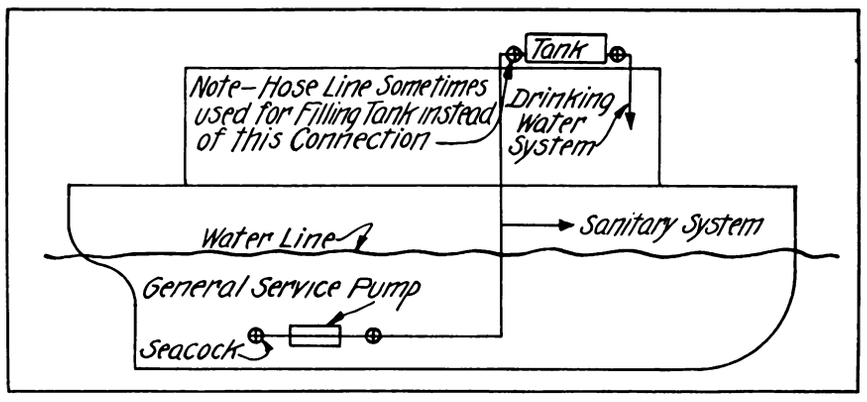

FIG. 4—TANK FILLED FROM SEACOCK BY GENERAL SERVICE PUMP. DRINKING WATER DISTRIBUTED BY GRAVITY

Sterilization by Heat from Steam Jet.—There were five vessels which treated the drinking water by heating with a steam jet. This scheme was devised by the Detroit city board of health in connection with the study, conducted by the board, of drinking water used on vessels entering Detroit. To operate this apparatus, water was pumped from the sea cock by means of an ordinary steam-boiler injector, and when discharged from the injector it was raised to a temperature of about 160 degrees Fahr. After leaving the injector, a steam jet was added to the line, further increasing the temperature to about 230 degrees Fahr. In this discharge line was placed a thermometer, and upon starting, the water was allowed to run to waste until the last-mentioned temperature was reached, at which time the waste line was closed and the water passed through several hundred feet of pipe placed inside a cylindrical tank through which cold water was circulated. This cooling tank reduced the temperature to about 130 degrees Fahr. From the cooling tank the water was run into the drinking-water storage tanks.

This apparatus, while able to produce good results under careful management, was liable to be mishandled. In the first place, it depended entirely upon the observation of the engineer as to the reading of the thermometer in order to be certain that no water reached the storage tanks which had not been heated to the above-named temperature, and as the water after heating was passed immediately to the cooling tank, it was not held at the high temperature except for comparatively a few seconds.

With a few modifications, the apparatus could be made "fool-proof" and automatic in its operation. These improvements consist in adding a supplementary tank, in which the hot water could be stored for perhaps five minutes before entering the cooling tank. It would also be possible to install a thermostat just beyond this retention tank, which would automatically control a waste valve and a valve leading into the cooling tank, so that unless the water leaving the retention tank was up to the required

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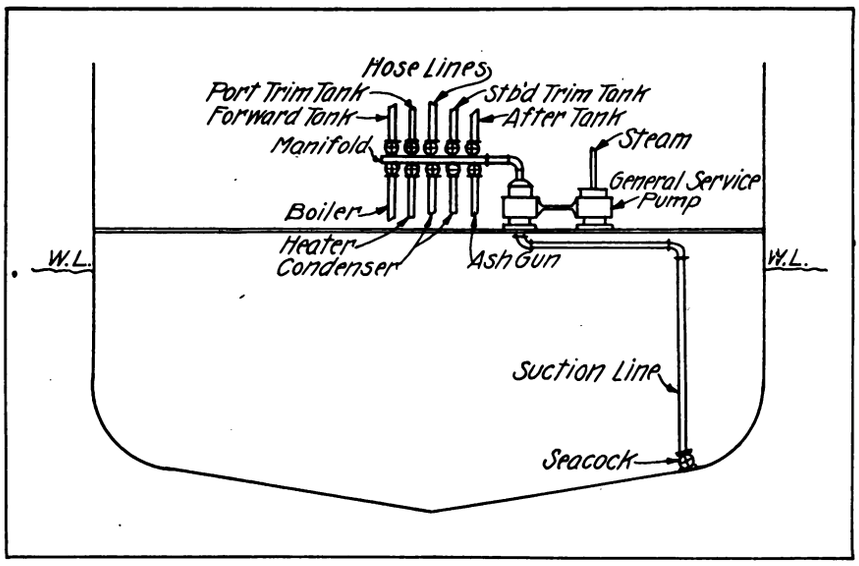

FIG. 5—CROSS SECTION OF VESSEL, SHOWING SEACOCK SUCTION LINE AND MANIFOLD

temperature, it would run to waste. Fig. 1 shows this apparatus with the suggested modifications. As in use during the past summer the retention tank was omitted, as was the thermostat, and in place of the thermostat-controlled valves hand-operated valves were used.

Results of Bacteriological Examinations.—All examinations made at the laboratory were strictly in accordance with the treasury department bacteriological standard of purity for drinking water for interstate common carriers, this maximum limit of permissible bacteriological inpurity being:

1. The total number of bacteria developing on standard agar plates, incubated 24 hours at 37 degrees Cent., shall not exceed 100 per cubic centimeter: *Provided*, That the estimate shall be made from not less than two plates, showing such numbers and distribution of colonies as to indicate that the estimate is reliable and accurate.

2. Not more than one out of five 10-cubic centimeter portions of any sample examined shall show the presence of organisms of the *Bacillus coli* group when tested as follows:

(*a*) Five 10-cubic centimeter portions of each sample tested shall be planted, each in a fermentation tube containing not less than 30-cubic centimeters of lactose peptone broth. These shall be incubated 48 hours at 37 degrees Cent. and observed to note gas formation.

(*b*) From each tube showing gas, more than 5 per cent of the closed arm of fermentation tube, plates shall be made after 48 hours' incubation, upon lactose litmus agar or Endo's medium.

(*c*) When plate colonies resembling *B. coli* develop upon either of these plate media within 24 hours, a well-isolated characteristic colony shall be fished and transplanted into a lactose broth fermentation tube, which shall be incubated at 37 degrees Cent. for 48 hours.

For the purposes of enforcing any regulations which may be based upon these recommendations the following may be considered sufficient evidence of the presence of organisms of the *Bacillus coli* group:

Formation of gas in fermentation tube containing original sample of water (*a*).

Development of acid-forming colonies on lactose litmus agar plates or bright red colonies on Endo's medium plates when plates are prepared as directed above under (*b*).

The formation of gas, occupying 10 per cent or more of closed arm of fermentation tube, in lactose peptone broth fermentation tube inoculated with colony fished from 24-hour lactose litmus agar or Endo's medium plate.

These steps are selected with reference to demonstrating the presence in the samples examined of ærobic lactose fermenting organisms.

3. It is recommended, as a routine procedure, that in addition to five 10-cubic centimeter portions one 1-cubic centimeter portion and one 0.1-cubic centimeter portion of each sample examined be planted in a lactose peptone broth fermentation tube in order to demonstrate more fully the extent of pollution in grossly polluted samples.

4. It is recommended that in the above-designated tests the culture media and methods used shall be in accordance with the specifications of the committee on standard methods of water analysis of the American Public Health Association, as set forth in "Standard Methods of Water Analysis" (A. P. H. A., 1912).

A total of 961 samples was collected and examined during the past summer from 74 different passenger vessels, and 68 samples were collected and examined from 33 different freight vessels. These samples were for the most part collected at Chicago and examined as soon as they reached the laboratory. Samples were also collected from vessels at Buffalo, Cleveland, Detroit and Milwaukee, and shipped on ice by express to the laboratory. These latter samples generally reached the laboratory within 24 hours after shipment, although in some cases it required 48 hours. Most of these outside samples were collected at Detroit, where very material aid was rendered by the local board of health, which had already inspected and examined the water supplies of all vessels running out of Detroit.

A series of vessels equipped with various types of purification apparatus were selected for intensive study. From these vessels, a great many samples were collected at various points in the purification systems in order to determine the efficiency of the apparatus.

The results obtained on both passenger and freight boats show that the methods of purification in use at the present time are very inefficient, less than 40 per cent of the samples conforming to the standard. There is but a slight difference between the results on passenger boats having no treatment and freight boats, which are without treatment, 22.4 per cent of the samples from passenger boats conforming to the standard, and 19.3 per cent of the samples from freight boats conforming.

A study of the results from different vessels in connection with the type of sea cock and arrangement used for taking on water shows that the arrangement has a very small effect upon the character of water obtained.

A study of the results according to the routes of the vessels, shows, as would be expected, that those vessels traveling in contaminated water and docking at polluted ports, had a considerably higher degree of pollution than vessels running in better water.

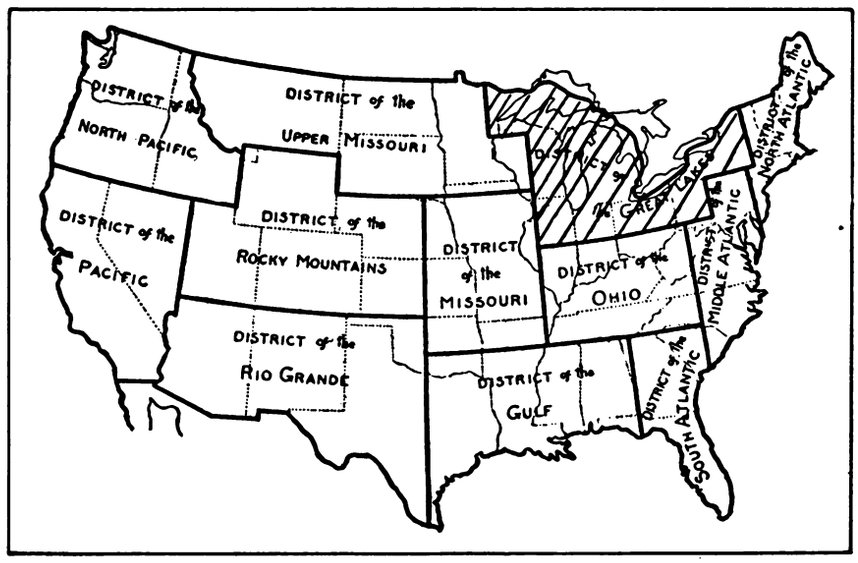
DISTRICT of the NORTH PACIFIC
DISTRICT of the UPPER MISSOURI
DISTRICT of the PACIFIC
DISTRICT of the ROCKY MOUNTAINS
DISTRICT of the MISSOURI
DISTRICT of the OHIO
DISTRICT of the RIO GRANDE
DISTRICT of the GULF
DISTRICT of the SOUTH ATLANTIC
DISTRICT of the MIDDLE ATLANTIC
DISTRICT of the NORTH ATLANTIC

FIG. 6—MAP SHOWING INTERSTATE SANITARY DISTRICTS. DISTRICT OF THE GREAT LAKES INDICATED BY DIAGONAL LINES

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The types of purification apparatus in use on vessels of the Great Lakes at the present time are woefully inefficient. There is not a method in use that can be depended upon to deliver a safe water at all times.

The route and docking place of the vessel play some part in the character of the water supply.

It is impossible, without treatment, to obtain a drinking water for boats directly from the lakes through the present piping systems that will at all times conform to the standard established by the treasury department.

Therefore, to comply with the law, it will be necessary for every vessel on the Great Lakes to install a method of water purification which shall be so constructed that it cannot under any conceivable circumstances deliver a water which will not conform to the government requirements. This will necessitate an apparatus that will be entirely automatic in action and proof against carelessness, indifference, and forgetfulness, as well as dependable in every stress of weather.

How to Avoid Accidents

THE annual report of the Great Lakes Protective Association points out that "the aim of the association, as navigators know, is principally toward the elimination of the avoidable accident. To this end we have proceeded quite satisfactorily during the seven years the association has been in operation, but it is a prominent fact that we have not yet reached our goal as the reports of masters covering damages sustained by their vessels during the past season would indicate. It is, therefore, pertinent that we should refer in a general way to the different classes of avoidable accident, calling attention to those which are most frequent and from which correspondingly heavy losses result. Accordingly we have selected for comment the following:

How to Prevent Collisions

"In the examination of damage reports received, we find a number of instances relating to collisions in channels which, in our judgment, are due to the careless handling of ships and to not keeping at a sufficient distance behind the leading vessel in narrow and congested channels and in many cases through attempting to pass ships going in the same direction where the maneuver is more or less dangerous.

"Quite serious losses have occurred through collisions between vessels coming to anchor in channels in thick weather. Particular care must be exercised in such situations to avoid collision.

"In our circular No. 26, of May 25, 1911, we recommended to masters not to attempt passing other boats going in the same direction between the lower end of Port Huron Middle Ground and Corsica Shoals light ship; also between the upper end of Russell island and the lower end of St. Clair Flats canal. We believe that this suggestion has saved many an accident, but is not heeded by all masters, which is apparent from the accident reports received. The rule should also apply to the meeting and passing of vessels in other similar dangerous places.

"Other vessels have caused accidents through passing at too high a rate of speed, their suction forcing the other vessel into collision. Such disasters we believe are entirely avoidable.

"We have examined the circumstances as related in a number of reports of collisions at sea and in no case do we believe that the collision was not preventable. Colliding with the stern of another vessel moving through the ice with attendant fogs in the spring of the year appeals to us as gross carelessness. We have had altogether too many cases under this heading each year.

"Frequent collisions in fogs have occurred and considering the statements of the masters concerned there is no doubt in our minds but that practically every one of them could have been eliminated by properly following the pilot rules and the suggestions of this association.

"There have been cases also of accidents through not following the defined courses appointed for Lakes Huron and Superior. While no serious accident has occurred during the past year this is merely a fortunate result in some of the cases related and we cannot too strongly impress upon our navigators the necessity, for the safety of all concerned, to follow these courses according to the rules adopted by the Lake Carriers' Association and endorsed by the Great Lakes Protective Association.

"Other collisions have resulted when passing vessels collide before they are clear of each other. This suggests the result of suction from the passing ship, and as the following vessel is generally held for damage done, which is usually serious damage, navigators should use all precaution to see that these collisions do not take place.

"We have a great many reports this season of vessels moored at loading or unloading docks when other vessels navigating in the immediate vicinity, either going to dock or leaving dock, collide with the vessel so moored and it seems to us that the proper precaution to avoid such accidents is not always taken by the master of the moving vessel. It would seem safer and cheaper to all concerned, if a landing or departure cannot be safely made, to have the assistance of tugs in the operation, so that these vexatious and seemingly unnecessary small accidents may not occur, and especially in the busy seasons when vessels are more or less congested in harbors due to the rush of business. Such conditions demand extraordinary caution, and it is expected that masters will not fail to have the assistance of tugs when in their judgment safe movement can be assured thereby. It is much better to invest a few dollars for protection in these situations than to damage the ship, and create loss to both the owner and underwriters.

Strandings and Groundings

"During the season numerous reports have reached us of strandings and groundings on account of foggy weather and through such similar conditions, and in noting the master's comment in the various reports, we are impressed with their lack of judgment in many cases. It should ever be in the mind of the navigator that taking unnecessary chances to make a little time is a very poor investment and generally results in exactly an opposite result by laying a ship up for repairs and costing his owner a great deal in anticipated profits and creating a correspondingly heavy loss to the underwriters. This statement, of course, does not apply to the majority of masters whom we find are very careful in this regard, but there are a few who do not fully realize the result of such careless navigation.

"We judge from the comment of the masters in the various accident reports received, that more particular attention should be paid to the action of currents and to the velocity of the wind existing at the time such landings are attempted. It is also known that currents exist at many docks at all times and masters should acquaint themselves with these facts so that these dangers may not be proved with the side of their ship. It is much

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cheaper to pay tug bills to make dangerous landings than it is to lay up ships for repairs.

"During the year we have had many complaints and damage reports from vessels which have been injured by striking the piers at the upper end of the locks at Sault Ste. Marie.

"During the coming year we trust that these avoidable accidents may be eliminated and that masters will take the necessary precaution to see that their boats are not caught in the current by the filling of the locks. Extraordinary precaution must be taken to eliminate this source of loss.

Disabled Steering Gears

"Reports of disabled steering gears still continue prominently in our list of accidents, resulting in claims. While we do not claim these accidents to be entirely avoidable, still we feel that there are altogether too many of them, and that if apparatus now installed shows a tendency to become disabled, owners should provide a new system of such efficiency that these occurrences may be minimized. We also believe that a great many cases occur wherein the accident is charged, improperly, to a disabled steering gear and might otherwise be explained."

How to Develop Our Foreign Trade

OF ALL the problems relating to foreign trade discussed at the fourth annual convention of the National Foreign Trade Council at Pittsburgh, Jan. 24-27, the lack of an adequate American merchant marine attracted keenest interest. Many of the 1,100 business men, who assembled at the Fort Pitt hotel as delegates from all parts of the country, had learned through unpleasant experience the intimate relation between American owned ships and the conquest of foreign markets. Many of these men were fairly bubbling over with accounts of their difficulties in obtaining vessel space for South American shipments. One half day was set apart for discussion of the "National Shipping Policy", but from the very start of the convention the troublesome merchant marine problem held the center of the stage. From the outset it appeared that some of the other difficulties discussed in connection with foreign trade might be eliminated in due time. But the merchant marine appeared the hardest nut of all to crack.

J. W. Powell, president of the Fore River Ship Building Corporation, and Captain Robert Dollar, the veteran Pacific coast ship owner, occupied the principal roles in the discussion of American shipping and ship building. Both spoke with a fervor born of the romance of the seas, but backed by a broad experience and thorough knowledge of their business that made their arguments convincing. Throughout the discussion could be traced a glimmering of hope for improved conditions through the establishment of the new shipping board, although regret was expressed that more men of broad experience had not been chosen.

Captain Dollar presented a report, prepared by the merchant marine committee of the council, in which was reviewed the effect upon shipping of war losses, of captured ships that had not been wiped off the register, and of the tonnage laid up to avoid capture. It was shown that slightly more than 50 per cent of the whole mercantile fleet of the world is available for peaceful trade at present; something like 10 per cent has been destroyed as a result of the war; the available merchant tonnage of the world today is only 85 to 90 per cent of what it was when the war broke out, after taking into consideration the tonnage built during the past two years, which tonnage was the smallest for a generation. The report took a decided stand against the clause in the shipping act appropriating $50,000,000 of public funds for the purpose of acquiring ships. The report said:

"An object lesson in the practical working of nationalization of shipping is in evidence today, for it is undeniable that much of the tonnage scarcity existing in certain trades has been artificially created by the action of officials in control of shipping, who have ordered ships to proceed from one end of the world to the other, unmindful of the fundamental principle that the proper function of shipping is to serve both ends of the trade routes * * * signs are not wanting that the public of the allied nations is beginning to understand that governmental control does not necessarily imply efficient handling."

The report further pointed out that the American merchant marine should be large enough to carry 50 to 60 per cent of our total foreign trade, speaking in terms of bulk; that between 6,000,000 and 10,000,000 tons of ships of all sizes and types would be needed to discharge such functions; that the investment represented in such a fleet would be 10 times the $50,000,000 appropriated by the ship purchase act. Therefore, the report urges, the duty of the shipping board is to evolve a policy which will provide inducements to operate tonnage under the American flag on equal terms with foreign ship owners, rather than to expend the appropriation under the dangerous conditions existing at present. Concluding, the report says:

"The first duty of the shipping board obviously is to acquaint the American people with the fundamentals of ocean transportation, especially as relates to American foreign commerce. And its second duty is to make recommendations to congress which will permit the development by private enterprise of a merchant fleet sufficient to give the United States what, for many years, has been denied it, a share in the ocean carrying trade of the world."

Mr. Powell's address dealt with the "Present Position and Prospects of American Ship Building." Tracing the rise and decline of the industry, he remarked: "Ship building, needless to state, goes hand in hand with shipping. In the days of our greatness as a shipping nation, the American ship yard ranked above all others and when our shipping sank to insignificance, its twin industry also reached the low ebb of its history. Few subjects have received more legislative attention during the last 25 years and none has called forth more ill-advised legislation."

After briefly summarizing this legisla-

The Heart of a Great Question

"Ship building and shipping are like the steel business, businesses of great extremes," said J. W. Powell, president of the Fore River Ship Building Corporation, in his address before the convention. "The present boom, which promises to last for a considerable period, will be succeeded by an equally severe depression and the time for the study of this situation and the application of laws that will minimize the effect of the slump is the present. The selection of any particular method for achieving this result is less important than the selection of some definite method. Given this method, there remains the permanent practical problem of its application to equalize the cost of building and operating American vessels as compared with foreign competitors. Whether this is done by direct subsidy, by mail subvention, by discriminating duties by tonnage, taxes or by any other means, it must be clearly recognized that it is only by overcoming the difference in operating and construction costs in this country and abroad that this industry can hold its proper place. If the American people decide that they need a merchant marine, they must face this payment as the price exacted of them by the conditions under which we live."

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tion, he said that the results "have been negative or positively harmful and precious years have been frittered away, so that today in its time of need this country finds itself faced by a shortage of shipping that is placing a burden on our commerce due to excessive freight rates that is appreciated by a very small proportion of the country's population."

He estimated that it will take fully 10,000,000 tons to cover the war loss in shipping. While all neutral ship yards are working to capacity, he said that about one-third of the ships being built in the United States are for foreign account and that it is unlikely that the year 1917 will see an increase of over 750,000 tons of American-built ships to our merchant marine. He added:

"It appears probable that the next five years will show a continuation of the growth of our ship building and, while high freight rates remain, a lesser but corresponding growth in our shipping."

Captain Dollar Stirs Trade Council

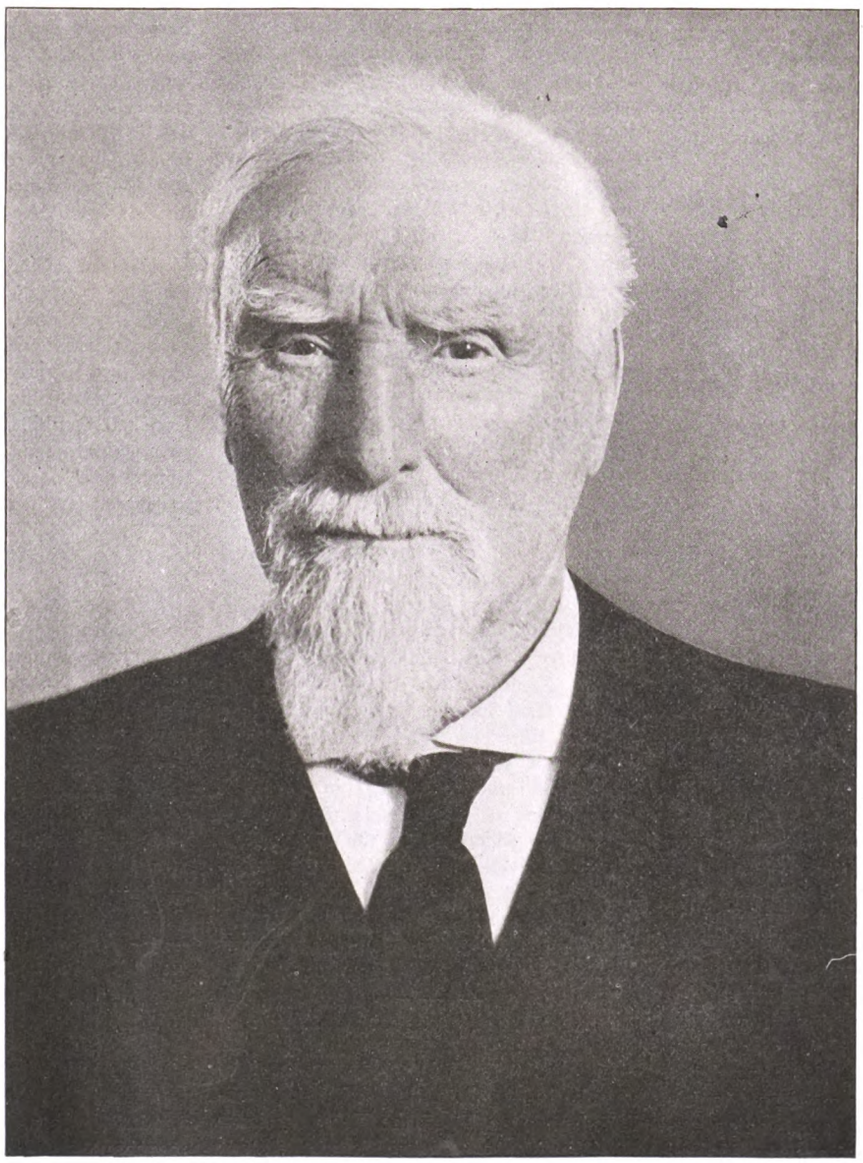
CAPTAIN DOLLAR was the central figure in the discussion of the "National Shipping Policy." After presenting the report of the merchant marine committee of the Council, he made some impromptu comment which interested the convention deeply. Despite his many years of experience as a ship owner and operator, Captain Dollar has lost none of the fire of youth. When he talked merchant marine he talked straight from the shoulder, calling things by their right names without regarding whom he hit. After he had concluded, the delegates gave him a greeting such as was not seen at any other time in the convention. Here are a few of Captain Dollar's characteristic remarks:

"Anybody can run a ship today. It would appear that the shipping industry is on the high road to prosperity, but when the crash comes, are we going to be able to compete with others? We don't do it. You have all heard of a windbag. You know what kind of a man that is. But a ship carrying wind is the most expensive proposition you have ever met.

"I am not making a political speech, but I will say: The Republicans did their level worst to hurt us when they were in power; but the Democrats were better figurers and were able to do us up better than the others. What we need is a little more construction and a little less destruction in our government's policy. The emergency bill was the only act passed by congress to help shippers that amounted to anything at all and that was drafted by a committee of this organization. But the ink was hardly dry when the La Follette bill wiped it out of existence. It would take half an hour to explain the La Follette bill and you would not be tickled to death with the explanation. That was by way of helping the American merchant marine over the left.

"As to the personnel of the shipping board, I know them all. They are men of the highest character, but when I want a suit of clothes made I do not go to the shoemaker. There are a lumberman, a lawyer, a railroad man and only two shipping men on the board. The seamen's union has done its utmost to prevent the ratification of the two shipping men. These men know too much about shipping and the seamen's union. In England they select as members of the shipping board the men who are most active in shipping.

"I will mention a few of the obstructions placed in the way of American shipping—only a few of them. Americans measure a ship bigger than anyone else, hence our ships pay 20 to 30 per cent more toll than any other ships in foreign ports. Our government is more rigid and often unreasonable in its inspection rules. Then there is labor. We took a record of three ships, an American, a British and a Japanese. The wages on the



CAPT. ROBERT DOLLAR,
Whose forceful and timely remarks concerning the merchant marine "brought down the house" at the convention

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American ship amounted to $39,242; on the British ship, $15,696; on the Japanese, $9,324.

"The ship owners do not want any subsidy, because a subsidy is like waving a red flag at a bull, in Washington, but if the other nations pay their sailors $20 a month and American sailors must have $50 a month, let the American people pay the $30 difference. That won't be a subsidy but only a little help to the poor men. When you men in the interior hire a man the matter of wages is between you and him, but in the shipping business the employer must let a commissioner hire his men.

"Here are a few figures on the situation in American shipping. Before the seamen's bill went into effect we did 26.9 per cent of the shipping business on the Pacific; last year we did 1.97 per cent of that business. Japan, before the war, did 26.05 per cent of the Pacific business and now it is 50.9 per cent. These figures are up to the first of the year. That is the seamen's bill. And here is a significant fact, showing the relation between shipping and foreign trade: Last year Japanese trade with South America increased 150 per cent."

Types of Ships Building

American ship yards are devoting themselves in increasing measure to building steel cargo boats. The following tabulation shows the types of steel merchant vessels building or under contract on July 1, 1916, and on Jan. 1, 1917, respectively:

	July 1, 1916.		Jan. 1, 1917.	
Type.	Number.	Gross tons.	Number.	Gross tons.
Cargo vessels	240	639,817	294	1,002,398
Oil and molasses tankers	80	500,608	76	429,916
Pas. & cargo ves.	8	52,328	7	50,728
Car floats & ferries	24	20,064	8	5,914
Towing vessels....	14	2,572	11	2,387
All others	19	10,395	7	4,258
Total	385	1,225,784	403	1,495,601

New Isherwood Boats

Since Dec. 1, 31 ships, which will be built under the Isherwood system, have been contracted for in the United States. These comprise 16 bulk oil carriers of 116,000 tons deadweight, and 15 other vessels of the first-class cargo type of 163,000 tons deadweight. Recent contracts also call for seven ships to be built under the Isherwood system in British and Japanese yards, these vessels representing about 70,000 tons deadweight. The total ship construction throughout the world, under the Isherwood system, is now about 4,820,000 tons deadweight. This is more than double the total tonnage of steel ships reported building throughout the United States at the present time.

In view of the wider adoption of this system of ship construction in the United States, J. W. Isherwood, its inventor, has established permanent offices and staff at No. 17 Battery Place, New York City. These offices are in charge of J. W. Stewart, one of Mr. Isherwood's principal assistants, and formerly of his London office. On his recent trips to American ship yards, extending over the greater part of a year, Mr. Stewart has visited ship builders on the Atlantic and Pacific coasts, as well as on the Great Lakes. His experience in ship building generally and in the Isherwood system in particular well fit him for the service he has undertaken.

Sets Record for Saving

C. F. Kennedy, first cook last season on the steamer LEONARD B. MILLER, has been awarded first prize by the Cleveland Trust Co., for his record in saving the largest proportionate share of the 1916 earnings of any lake sailor. Mr. Kennedy banked during that time 218.1 per cent of his earnings. Second prize was awarded to Joseph White, oiler on F. E. HOUSE, whose record showed savings of 217.5 per cent. Mrs. Harry Bitner, second cook on SIRIUS, was third with 206 per cent; William Bentner, first cook on CENTURION, fourth with 198.5 per cent, and J. Duncansen, second mate on THOMAS ADAMS, fifth, with 185.2 per cent.

The contest hinged upon the largest proportion of earnings deposited, thus giving all grades an equal opportunity. The awards were made by a committee composed of the editor of *The Marine Review* and the marine editors of the Cleveland *Plain Dealer* and *Leader*.

The splendid records established by the prize winners were closely matched by a great many others. The savings plan inaugurated by the Lake Carriers' Association six years ago has grown constantly. The total number of accounts opened since the beginning is 10,230. The balance remaining on deposit at the close of 1916 was $200,000 more than at the close of 1915. The association points out that in the Shenango fleet of five vessels the average deposit is $3,991.78; in the larger fleet of the Cleveland-Cliffs Iron Co., consisting of 23 vessels, the deposits average $3,247, while in the big fleet of the Pittsburgh Steamship Co., the average is no less than $1,759.48.

Lake Accidents

In the table of accidents to lake vessels in the last half of 1916, published on page 72 of the February issue of *The Marine Review*, it was stated: "Str. S. S. CURRY hit by steamer FRANK ROCKEFELLER * * *." The word "by" was inserted through a typographical error. The line should have read "* * * hit steamer FRANK ROCKEFELLER."

Pargny is Launched

The steamer EUGENE W. PARGNY was launched successfully at the Lorain, O., yards of the American Ship Building Co., on Saturday, Jan. 20. It was the first midwinter launching in the history of the yard. The slip into which the vessel was launched was covered with a thick sheet of ice but when the big hulk struck the water, the ice crumbled into fragments and as the vessel moved to the other side of the slip she pushed big cakes of ice high on the opposite bank.

The big bulk freighter is being built for the Pittsburgh Steamship Co. She will be completed by the opening of navigation. The vessel was christened in honor of President Pargny, of the American Sheet & Tin Plate Co. Mrs. Pargny was the sponsor. The launching party included Mr. and Mrs. Pargny, with a party of friends from Pittsburgh, and H. Coulby, president, and other officials of the Pittsburgh Steamship Co. PARGNY is 600 feet long, 60 feet beam and 32 feet deep. She will carry 12,000 tons of ore. She will be taken out next spring by Captain Gegenheimer, who commanded WILLIAM P. PALMER last season.

Another vessel, of the same dimensions, also is being built by the American Ship Building Co., for the Pittsburgh Steamship Co. She will be launched within a few weeks. The steamship company also is having built a third vessel of the same size, which will be delivered this spring.

Death of L. E. Cooley

Lyman Edgar Cooley, an eminent civil engineer and an authority on waterway construction, died in Chicago, Feb. 3, aged 67 years. He made the plans for the drainage canal that reversed the current of the Chicago river and drew water from Lake Michigan. He was connected with the sanitary district of Chicago since 1885 and was its consulting engineer until about a year ago. He also was consulting engineer for the Lakes to the Gulf Deep Waterways Association under two administrations.

Death of J. P. C. Church

J. P. Curran Church, vice president of the Northern Michigan Transportation Co., died in Chicago Jan. 25, aged 84 years. He formerly was a merchant at Traverse City and Elk Rapids, Mich. He served as first lieutenant in the seventieth Michigan volunteers during the civil war.

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What the Government is Doing

Rulings on Marine Matters **Improvements to Waterways**

Hints to Navigators

Belated Ruling on Ship Construction

NOT ONLY must vessels built since the passage of the LaFollette seamen's act be constructed for the accommodation of the crew and otherwise as specified in that act, but all vessels built since 1897 must be reconstructed to conform to the same requirements. This is in substance the decision of Attorney General Gregory, announced Jan. 5. The decision was rendered to President Wilson and bore the date of July 26, last. It was in response to an inquiry of President Wilson's of May 12, last. Why the decision was not made public before, was not disclosed.

The seamen's act makes certain requirements regarding the construction of vessels, for the accommodation of the crew, etc., which must be observed in the building of all vessels after the passage of "this act". The attorney general holds that "this act" is the old act of March 3, 1897, and not the seamen's law which was enacted on March 4, 1915. It therefore follows that the space requirements of the new law will apply to all vessels built since 1897, he says.

Important points in the attorney general's communication to the President stating his opinion and the reasons for it are the following:

"The pertinent part of section 6 of the seamen's act of 1915 is as follows:

Sec. 6. That section two of the act entitled "An act to amend the laws relating to navigation", approved March third, eighteen hundred and ninety-seven, be, and is hereby, amended to read as follows:

Sec. 2. That on all merchant vessels of the United States the construction of which shall be begun after the passage of this act, except yachts, pilot boats, or vessels of less than one hundred tons register, every place appropriated to the crew of the vessel shall have a space of not less than one hundred and twenty cubic feet and not less than sixteen square feet, measured on the floor or deck of that place * * *.

"Section 6 not only recites that the amended section 2 is 'to read as follows,' but sets it off from the rest of section 6 by quotation marks and gives it the original section number, to wit., 'section 2,' thus showing that the part in quotations was to be inserted in, and considered as an integral part of, the amended act of 1897. We must then construe the act of 1897 as amended by section 6 of the act of 1915 as if originally enacted in that form.

"Unless there were compelling reasons, recognized by law, why an interpretation should be given to these words different from their ordinary signification, they must be construed to refer to the earlier act, and so to require a larger space for living quarters of sailors upon vessels constructed after the passage of the act of March 3, 1897, and not only upon those constructed after the passage of the act of 1915.

"The only other possible construction would make the words 'this act' refer to the act of 1915. The effect would be to remove all restrictions whatsoever with respect to space allotment upon vessels built prior to 1915, because the act of 1915, in reenacting section 2 of the act of 1897, as amended, did not preserve the existing requirements, but, on the contrary, repealed them by implication, since the later act covers the whole subject of the earlier.

"Being reduced to this choice, I think the intent of congress as indicated by the general purposes of the act and by the words actually used, when given their ordinary and grammatical meaning, is more clearly effectuated by construing the words 'this act' to refer to the act of 1897 rather than to the act of 1915.

"The fact has not been overlooked that a sentence in the report accompanying the bill upon its submission to the house of representatives apparently construed these words differently. The language used by the committee in its report, however, cannot be made to control the language of the act.

"It should be borne in mind that the act (section 18) afforded ample time to ship owners to make all necessary changes in their vessels.

"In my opinion, therefore, the words 'this act' should be construed to refer to the act of March 3, 1897, the necessary effect of which will be to make the space requirements of the law apply to all vessels constructed after the passage of that act."

Quits Shipping Board

The resignation of Bernard N. Baker, Baltimore, from the new federal shipping board was received Jan. 27 by President Wilson and accepted immediately.

The decision of Mr. Baker to resign was taken suddenly and grew out of a suggestion from William G. McAdoo, secretary of the treasury, that it would be wise to have a man from the Pacific coast as chairman of the board. President Wilson agreed with Secretary McAdoo in this. They had in mind for this place William Denman, San Francisco, who was appointed to the shipping board for a term of six years on Dec. 22.

A statement issued by Secretary McAdoo officially explained that Mr. Baker resigned the morning after he was told of the wishes of the administration. The resignation was not formally laid before the President and accepted until Jan. 27.

The proposed explanation of Secretary McAdoo has been construed as meaning that Mr. Baker was ambitious to become the chairman of the shipping board and that he resigned when he learned of the administration's wishes. Mr. Baker was actively associated with Secretary McAdoo in the pre-legislative campaign of the administration in favor of the creation of such a board. As a result of this activity and interest, it was believed that Mr. Baker would be considered for appointment as the board's first chairman.

In the act of Sept. 7 last for the creation of the board it is provided that the President shall name its members but that the members themselves shall annually name their chairman.

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On Dec. 22 the President announced that he had designated the five members of the board, but their names were not officially presented to the senate. They were designated in such fashion as to indicate rather unmistakably that while the administration had no legal right to name the board's chairman, it rather wished to have Mr. Denman named chairman. The board members were designated in the following order of seniority:

William Denman, San Francisco, for a term of six years; Bernard N. Baker, Baltimore, for a term of five years; John A. Donald, New York City, for a term of four years; James B. White, Kansas City, for a term of three years, and Theodore Brent, New Orleans, for a term of two years.

As the administration was anxious that the chairman should come from the Pacific coast, and Mr. Denman is the only member of the board from that section, it is apparent that the President and Secretary McAdoo had Mr. Denman in mind for the chairmanship of the board. One of the reasons given for this preference was to escape the possible pressure of conflicting interests in the shipping and ship building industries along the Atlantic seaboard.

Three members of the board had been selected from this section in order to give representation to the preponderating capital and development of the shipping interests of the country. Another consideration was the desire to recognize the necessity for building up American shipping in the Pacific, where it is now in a serious decline. Mr. McAdoo's formal statement was as follows:

"It is true that Mr. Bernard N. Baker has resigned from the shipping board and that the President has accepted his resignation. Mr. Baker resigned because I suggested to him that I thought it would be wise, in the circumstances, if the board would consider giving the chairmanship to the Pacific coast. The President was in accord with this suggestion. Mr. Baker said he desired to think the matter over for the night. The next morning he sent his resignation.

"The selection of suitable men for the shipping board and the proper organization of the board have been matters of great concern to the administration ever since the passage of the shipping bill. The suggestion about the chairmanship was made in a spirit of co-operation and with a desire to be helpful. The board has the right under the law to select its own chairman, but there is no reason why a suggestion from the administration should not receive consideration."

Report on Bulkhead and Loadline Regulation

Secretary of Commerce Redfield and the committee of ship builders and ship owners have laid before the United States shipping board the report on bulkhead and loadline regulation. It was recommended that the British rules be adopted for American ocean-going vessels, and that the subject be studied further for American coastwise, lake, bay and sound vessels. The report in full follows:

"Article I.—Sea-going ships.

"(1) As the question of determining the proper loadline for various types of ocean-going vessels has been the subject of an exhaustive investigation conducted by the British authorities, and,

"(2) As it appears unnecessary to repeat the same work in this country, and,

"(3) As the United States is already a member of an international congress upon this subject, which would have met before this time, but for the present war in Europe, and,

"(4) As it is generally conceded in maritime circles that the present loadline, as established by the British practice in general, render the vessels safe and seaworthy,

"Your committee therefore recommends:

"(1) That the United States adopt a method for the determination for freeboard of ocean-going vessels which will give, in general, the same loadline as that established by the present British practice, this method to remain in force until such time as an international commission shall be called to establish an international loadline.

"(2) As British tables at present in use are recognized as being somewhat cumbersome, they would need some revision in order to conform to the present-day American practice in ship building.

"Article II—Coastwise, lake, bay and sound vessels:

"(1) As vessels engaged in the coastwise, lake, bay and sound trade are not only operating under different conditions, but are in most cases of a different type of construction when compared with ocean-going types, and

"(2) As any set of freeboard tables based upon ocean-going types would be inapplicable to such vessels, and

"(3) As the preparation of such rules and tables would involve a thorough and exhaustive examination of existing vessels, in order to establish what may be called the American practice in loading and operating such vessels, and

"(4) As proper, just and safe loadlines can be established only after such an investigation has been made, and the results carefully analyzed by proper scientific methods, and

"(5) As such an investigation will necessarily take some time and involve some expense,

"The committee recommends:

"(1) That the present committee be continued and conduct such an investigation, and that the shipping board appoint one or more of their number to sit with the committee in their deliberations.

"(2) That a fund be established to take care of the necessary expense involved in such an investigation.

"(3) That, owing to the importance which your committee attaches to such an investigation, if it is deemed improper for the commission to apply any of its funds for this purpose the committee be authorized to take such steps as are necessary to raise such funds."

U. S. Ammunition Ship

By W. R. Osborn

Already specifications for the steel for the ammunition ship assigned to the Puget Sound navy yard have been sent to the purchasing office with the request that the material be ordered at once. The boilers also have been planned and a request sent to the navy department that they too be ordered. It is intended to have the $800,000 building ways on which to construct the vessel completed and the keel laid in six months, leaving about nine months in which to do the actual construction work. Lieutenant Commander W. B. Wells, engineer officer at the yard, states that they hope to have the required material on hand when needed by ordering now, and if successful in securing men, to have the boat completed within the contract time. This is the situation at the Puget Sound yard.

At an early date the Puget Sound navy yard began construction in a small way, building lighters and barges, floats and small boats. Fourteen months ago building ways of sufficient size to carry vessels up to 275 feet in length, or 50 feet in beam, were completed and the large ways on which work may start any day, when built to their full length, will handle the largest vessels of the navy. In the next few months a new woodworking shop will be added, modern woodworking machinery installed in the present shop and a general plan of rearrangement carried out which it is estimated will take all of the appropriation of $2,065,000.

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England Maintains Her Supremacy

In Spite of Submarines and Reduced Construction British Merchant Marine Grows—After-the-War Policies Being Formulated

By Joseph Horton, Staff Correspondent, The Marine Review, Birmingham, England

THE British shipping industry concentrated upon itself an extraordinary amount of public attention throughout the year 1916—sometimes complimented by cabinet ministers and leading statesmen for its valuable aid in the war; at other times furiously assailed by trade unionists and others for what has been described as "rapacious profit-mongering." Its vital importance to the war has been fully recognized, British ships being the link between an island unable to feed itself, and the great sources of food supply all over the globe. There have been clear indications lately that the allies of Great Britain have shared to an increasing extent in the services of the mercantile marine in the maintenance of supplies of food and other material. It is no secret that Italy, for example, has lately received full consignments of food and material from British colonies.

The year just ended was a great year for ship building as well as a period of high freights and exceptional profits. It was also a year of unexampled difficulties, arising on the one hand from scarcity of labor for ship building and on the other from the enormous services which the merchant ships of England have to render in the transport of men and material to the various fighting arenas. Early in the year Mr. Runciman stated that British companies had 60 to 70 per cent of their fleets on requisitioned rates and only 30 to 40 per cent on market rates. The proportion devoted to war service has considerably increased since that time.

The last authoritative statement on the subject was made by Mr. Runciman, president of the board of trade in the house of commons on Nov. 15, and the minister suggested the possibility that the number of vessels left available for ordinary merchant shipping purposes might have to be still further reduced owing to the growing needs of the army and navy. He then stated that in normal times England could in a year add 2,000,000 gross tons to her mercantile shipping. The total tonnage lost since the beginning of the war is 2,250,000 tons. In the quarter ended June, 1916, British ship builders completed only 80,000 tons, and if that small rate of proportion had continued, the country, in the words of Mr. Runciman "would have been landed in the very gravest fix that the empire has ever known." Fortunately, it has been able to increase the rate of production so that he anticipates that the output for the second six months of the year will approach 500,000 tons. Ship building, said Mr. Runciman, is being directly encouraged by the government on the principle of treating the various ship building yards as one big concern.

Under a special arrangement the various ship building works pool their skilled labor, and concentrate their attention on those vessels approaching completion, one after another. The intention was, said Mr. Runciman, that by the end of December or the beginning of January there would be no vessels waiting half completed, but all would be proceeded with by regular course. The government is fully alive to the necessity of proceeding with the construction of the vessels needed most.

America's Chance

Various problems have been raised in connection with future policies of ship builders and shipping companies. It is fully recognized that a great deal of the foreign trade has passed into the hands of neutrals. Formerly, thousands of vessels were employed in carrying goods between foreign ports, whereas at present there are only hundreds. There is a great desire on the part of the ship owners that this business should be recovered at the end of the war, and any future policy will undoubtedly have this in view. Otherwise, the shipping supremacy of Great Britain will disappear.

Bring Soldiers Back

Mr. Runciman made a very frank confession which confirmed what was very well known, and has been a subject of regret and complaint through the shipping industry. Large numbers of men were taken from the yards in the early days of recruiting, sometimes through the impetus of patriotism, but in some cases also through pressure from persons of influence who should have known better. Many of those men will have to be brought back again, and, by the complete organization of labor, it is hoped to put them to the best use.

It should be added that the trade unions, usually very jealous of their rights and privileges, have patriotically rendered valuable assistance in making the most of the labor available, by what is called the "dilution" of labor, that is keeping skilled men strictly for skilled purposes, and bringing in unskilled men and women to do work which in ordinary times would be left to recognized trained tradesmen.

The enormous part played in the war by the navy has made heavy drafts upon ship building yards ordinarily devoted to the production of mercantile ships. Mr. Balfour stated a short time ago that while we started the war with a fleet more powerful than any of Britain's enemies, and indeed more powerful than all combined, since the war bróke out the fleet has increased not only absolutely in numbers, in power and efficiency, but as compared with the capital ships of the enemy relatively also. In fact the naval strength in every department has greatly increased. This statement suggests the keen competition for tonnage which has prevailed practically throughout the year between the naval and the mercantile branches of ship building. Great Britain owns, roughly speaking, about half the mercantile tonnage of the world and half of that tonnage is, at present, earmarked either for the purposes of the war or the supply of the allies of Great Britain. In fact very early in the war 10 per cent of the British tonnage was handed over to the allies. On the whole, our statesmen who know a great deal more than outsiders of the strength of the navy and of the mercantile marine, are very well satisfied with the work that has been done in producing and maintaining those two great services.

The annual report of Lloyds Register of shipping for 1915-16, recently issued, states that the disappearance from the high seas of the merchant fleets of Germany and Austria Hungary and the continued losses of allied and neutral shipping combined with the enormous demand which the war has made upon the available tonnage has produced a shortage which has stimulated the building of ships in every country free to engage in ship construction. Recognition is made of the great activity in the United States to cope with the increasing demand for tonnage and taking the world over, a larger amount of shipping is in course of construction than has ever been recorded, namely 620 vessels of 2,282,709 tons. For the year ended

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Britain May Be Handicapped After the War

Probably the only measure of success realized by Germany against Great Britain has been in its campaign of attack by submarines. Nervous people have been appalled by the daily record of ships reported sunk; but anxiety is to some extent allayed when the pessimists realize that the net loss of tonnage through submarine warfare is about 2½ per cent on the whole merchant fleet. Fortunately, Great Britain has a vast mercantile marine, and so it comes about that the proportional loss to merchant tonnage through enemy submarines is less than that caused by enemy ships during the years following Trafalgar. In the first 18 months of the war Great Britain lost 307 vessels valued at $51,700,000 or an average of $168,000 each, with cargoes valued at $63,350,000. These losses not only cause present inconvenience in the conduct of the war, but reduce the prospective ability of the country to contend with its rivals for the international trade after the war.

The shipping companies of Great Britain regard this with considerable concern, and go so far as to say that after the war the practical control by British shipping of the sea-borne commerce of the world will no longer remain unchallenged. While the mercantile tonnage has been seriously depleted by war losses, the output of fresh tonnage has been on a limited scale, and it is well known that there has been great activity in the ship building yards of neutral countries.

June 30, last, classes were assigned to 362 new vessels of 790,209 tons, of which 356 were steamers or motor vessels of a tonnage of 789,688, while six were sailing vessels of 521 tons. Of the above total 55½ per cent were built for the British Empire (United Kingdom 397,852 tons, Dominions 16,605 tons) and 375,747 tons or about 47½ per cent to other countries.

For Whom Should They Build

The question has been raised whether British shipbuilders shall hold back orders for neutral shipowners, and give preference to British companies and the country's allies. The problem is rather a knotty one, because British shipbuilders are not prepared to allow their ship building supremacy to be lost through the refusal of orders from foreign firms. On the other hand, there is great reluctance to build for potential rivals ships required by British companies. It is argued that to build ships for employment under the British flag is better than to build ships which will sail under foreign colors, since, in the former case, the profits of building are secured, with the prospect of a substantial revenue from their employment in the ocean carrying trade. A great deal of the speculation as to the future it is recognized has an element of futility, since there will be a great temptation in the keen competition which will follow the war to take the order of the highest bidder. At the same time there is already a demand on patriotic grounds that ship builders shall be compelled to give precedence to the building of ships destined to fly the British flag. In this connection there is no little soreness over the fact that foreign shipowners have benefitted by the substantial rise in freights resulting from the requisitioning of tonnage by the admiralty, while they have escaped the heavy additional war taxation which has fallen upon the owners of British ships. It is because of this serious view taken by ship builders of future competition that so many of the British shipping companies have lately been entering into new combinations, while carefully establishing strong reserves to meet future emergencies. Among the combines of the year have been the following—the New Zealand Shipping Co., Ltd., and the Peninsular & Oriental Steam Navigation Co.; the purchase of the fleet of the London & Northern Steamship Co., Ltd., by Pyman Watson & Co., Cardiff; the acquisition by Furness Withy & Co., Ltd., of the whole fleet of the Prince line consisting of 42 steamers; the acquisition by the Universal Steam Navigation Co. of the Ariadne Steamship Co., Ltd.; the purchase by Petersen & Co., Ltd., of the Calliope Steamship Co., Ltd., and the London Marine Steamship Co., Ltd. Many other examples might be cited.

The reason for this is the expectation of tremendous competition after the war, which must lead to a heavy fall in freights, and a severe financial strain to all the companies concerned. Of course, it is not denied that shipping has been tremendously prosperous, and it is on the foundation of this prosperity that the companies base their confidence for the future. To mention only a few, the Cairn line increased its dividend from 10 per cent to 30 per cent, the Court line from 10 per cent to 16 per cent, Mercantile Steamship from 17½ per cent to 35 per cent, and side by side with these dividends the carry-forward has been greatly increased. A striking example is that of the Leyland company which increased its profits from $1,492,000 in 1914, to $5,810,000 for 1916.

So far the steamship companies have managed to resist the tremendous agitation for reduction of freights, one reason undoubtedly being that if freights were artificially reduced ships would be diverted to other countries prepared to pay higher prices than are offered in England. The government which has just been replaced repeatedly refused to declare commercial shipping a controled industry with a view to the regulation of freights. Mr. Runciman when questioned on this subject said that the government went fully into the question of commandeering the whole of British shipping in order to regulate freights and they came to the conclusion, which was confirmed by experts, that this particular remedy would only aggravate the shortage of tonnage available for the United Kingdom and the allies and would make things worse instead of better. It does not follow at all that the new government will take this view and indeed if current rumors are well founded, Lloyd George, the new premier, has secured the support and co-operation of the Labor party under a pledge to take over the whole of British shipping, in addition to the mines of the country. There is no great confidence in shipping circles that this policy will carry out the object in view, while, of course, by the interests concerned it would naturally be regarded with disfavor.

The Ton-for-Ton Policy

Another matter on which strong action may possibly be taken relates to what is known as the ton-for-ton policy. This consists in a claim very strongly put forward and supported by London and Birmingham chambers of commerce and other influential commercial bodies that Germany shall surrender shipping tonnage equivalent to that sunk during the war. It is urged that this would represent bare justice while it would do something to checkmate that vigorous mercantile warfare on which Germany is believed to have set her heart as a definite policy after the war. It is said that Germany can very well make this reparation seeing that before the war she possessed something like 5,000,000 tons of shipping of which very little

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has really been lost since what has not been captured by British warships and brought into British ports remains in enemy or neutral harbors. So far the government has not indicated its mind on this matter but it is not impossible that the new government which has been chosen largely to carry out a much more drastic policy may think fit to adopt some such sweeping measure. There seems force in the contention that if at the close of the war Germany is free to utilize to the fullest extent all the mercantile ships now idle in various harbors she will be extremely well armed for the fierce commercial contest by land and sea which everyone expects must come with the declaration of peace.

On the whole it is surprising how well in spite of the submarine menace and the enormous demands for purely war purposes, the ordinary shipping accommodation of the world has been maintained. A glance at the shipping lists shows that the traffic between Great Britain and the two Americas seems to have been the most favored. Some of the largest lines maintain their sailings almost as well as before the war. The great passenger lines, according to the shipping agents, have a fairly regular program not materially varying from pre-war times but occasionally a sailing is omitted by arrangement with some other shipping company running a steamer at the same time and able to adequately deal with the traffic. The American line is spoken of very well as keeping up its services twice a week. The White Star is considerably reduced, but chiefly in the direction of occasionally having a gap of a fortnight instead of a week between the departure of its boats. The chief difficulty is in regard to freight, for which sailing permits have to be obtained. The South American mercantile ships still go backward and forward in great numbers. The chief reductions are in the Eastern and Australian services which have lately suffered greatly from the submarine menace. The P. & O. boats have been particularly unlucky, and no doubt the Germans regard their Mediterranean achievements in the destruction of shipping as among their best successes.

After the War What?

Naturally, the shipping interests look with considerable anxiety to post-war conditions. A vast building boom is regarded as a certainty. It will probably be found although very little information is circulated on the point that many new ship building yards have sprung up and enlargements of existing yards have been on an extensive scale. In Belfast especially great preparations are being made for enlarged production. One great firm has recently taken over 41 acres of additional land and the Belfast harbor board has let another 50 acres for a new yard. It is quite conceivable that ship building capacity will be found after the war to have increased side by side, and possibly in parallel degree, with the vast growth of the steel industry. In view of the vast importance of the ship building industry to Great Britain it may be taken for granted that no effort will be spared to secure its maintenance and growth in the future.

The Locomotive Superheater Co., New York, is distributing an attractive booklet which lists 69 vessels equipped with the company's superheaters. These ships range in size from a 398-ton sea-going tug to a 9,500-ton Pacific liner. The list is not intended to be complete as more than 1,300 vessels of more than 1,800,000 indicated horsepower are now equipped with superheaters.

STEAMER INDIANA, OF THE GOODRICH TRANSIT CO.

She ran aground Sunday morning, Jan. 14, on submerged rocks close to the government breakwater north of the entrance to the Chicago river. A dense fog was the cause of the accident. Most of the cargo was removed before the steamer was floated on Jan. 16. She was taken at once to South Chicago, where she was docked. An examination revealed that the accident had been much less serious than was feared, the stem, forefoot, forward keel and a small portion of the forward planking being damaged. The illustration shows the steamer on the rocks with a tug attempting to release her.

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Late Decisions in Maritime Law

Legal Tips For Ship Owners and Officers

Specially Compiled for The Marine Review

By Harry Bowne Skillman

Attorney at Law

THE FACT that one making repairs and furnishing necessary supplies to a vessel does not surrender a note given by the owner for such repairs and supplies, is not ground for denying him a lien against the vessel as against other lien claimants; the objection is personal to the maker of the note.—Fairhope, 235 *Federal Reporter* 1007.

* * *

A towing tug is under no obligation to remain with the scow towed after leaving her in a safe place in a dock to await her turn to discharge, with directions to the master to put out lines. "If such vigilance were required of towing companies," said the court in Milton, 235 *Federal Reporter* 287, "they could not long continue in business."

* * *

The court in the case of Natchez, 236 *Federal Reporter* 588, decided that the stockholders of a corporation organized merely for the purpose of owning and operating a certain boat, and having no other assets, and being dormant, and the boat laid up, are not entitled to a lien for money advanced to the corporation to make repairs as against third persons who furnish the work and materials in making such repairs.

* * *

"In the absence of a contract or of a custom binding upon the parties to the contrary, it is as much the duty of the ship owner to load and discharge the cargo as it is to carry it between the loading and discharging ports." This duty, it was said in Munson Steamship Line vs. Glasgow Navigation Co., Ltd., 235 *Federal Reporter* 64, applies to chartered ships, whether on time charter or voyage charter, provided the ship is not demised.

* * *

"Default", as used in charter party, providing that a fixed sum per day shall be paid "for each and every day's detention by default" of the charterer, does not involve any question of fault, it was held in Southern Transportation Co. vs. Unkel, 236 *Federal Reporter* 779, but means merely failure to comply with the agreement to complete the loading in stipulated time. The court further decided that unusually cold weather, which delayed loading, but did not actually prevent it, did not relieve the charterer from liability for demurrage.

* * *

Under rule 22 of the rules enacted by congress for the prevention of collisions on the Mississippi river, reading, "Every vessel overtaking any other vessel shall keep out of the way of the last named vessel," it was held in Atlas Transportation Co. vs. Lee Line steamers, 235 *Federal Reporter* 492, that the overtaking vessel has to be its own judge as to the matter of safety, as whatever risk attends its passage from the narrowness of channel, the shallowness of water, the current, suction, or other causes, except the fault of the vessel overtaken, is assumed by it.

* * *

The difference between "salvage service" and "towage service" was set forth in KENNEBEC, 231 *Federal Reporter* 423, where the former was defined as a service voluntarily rendered to a vessel needing assistance, and designed to relieve her from some distress or danger either present or to be reasonably apprehended. The latter was defined as a service which is rendered for the mere purpose of expediting the vessel's voyage, without any reference to any circumstances of danger. It was held that a contract by one party to pay at all events, and by the other to receive, a fixed compensation for salvage service to be rendered, is valid and conclusive of the amount recoverable.

* * *

The steamship GERTY with a cargo of lemons from Italy to New Orleans, stopped at Havana to discharge some cargo, submitted to fumigation by the quarantine officers of the United States, by which the lemons were injured. Necessity of fumigation could have been avoided by discharging with lighters or at a rat-proof wharf, which the Havana agent of the ship knew, or she could have proceeded and submitted to fumigation at New Orleans, either before or after discharging. It was decided, in an opinion in 231 *Federal Reporter* 427, that the master of the ship had reason to and did apprehend injury to the cargo, and that it was negligence on his part not to protect it by one of the means open to him, which rendered the ship liable for the damage. In the same case a provision in bill of lading requiring notice of any claim for damage to cargo before removal of the goods, construed as meaning before removal from the wharf, was held to be reasonable and enforceable, where the consignee had knowledge of the damage before such removal.

* * *

The United States statute prohibiting anchoring in navigable channels in such manner as to obstruct passage of other vessels, it was decided in JOHN G. MCCULLOUGH, 232 Federal Reporter 637, does not absolutely forbid anchoring in navigable streams, other than at such places as would necessarily prevent the passage of vessels, or obstruct them in passing, to such an extent as to make the effort to do so a dangerous maneuver, and if a vessel anchored at a point in the channel where, notwithstanding such anchorage, other vessels navigating with the care the situation received, could safely pass, then she did not render herself liable, even though in some degree she obstructed the channel.

* * *

A dry dock, according to the opinion in the case of Anglo-Patagonian, 235 *Federal Reporter* 92, is part of the navigable waters, and a contention that an accident to a workman on a vessel not afloat at the time, but resting upon supports in the bottom of a dry dock, happened on land, must be rejected. The court held, also, that the circumstance that the injured workman was taken in an unconscious condition, and therefore without his knowledge or assent, from the dry dock to a nearby hospital, where he died shortly afterward, cannot serve to defeat the jurisdiction of the admiralty courts, which would have attached if death had taken place at the scene of the accident itself.

* * *

The question of the right to lien for wages was in issue in the case of CHICAGO, 235 *Federal Reporter* 538, where it was decided that one performing the ordinary duties of a master of a barge, but not the record master, is not defeated in his right to a lien for services rendered. Further, the court held that "A person contracting to work for another for hire, and incidentally rendering services upon a vessel, could not later claim a lien against the vessel, if a definite contract to enter into the personal employment of the individual could be affirmatively shown, and if the services were not to be rendered to the vessel or to the charter of the vessel as such. Such an employe would not be a seaman."

* * *

In the case of Alaska Steamship Co. vs. Gilbert, 236 *Federal Reporter* 715, it appeared that no hours of employment were specified in the shipping articles of a seaman, employed as night watchman, but that on a previous trip on the same vessel his hours were from 6 p. m. to 6 a. m., and that he understood that the same hours applied upon the trip in issue. He was asked to go on watch at 5 p. m., and, though stating that he would be entitled to overtime, and would not so work unless paid, he nevertheless entered upon the discharge of his duties. He was discharged on reaching the next port of call, being paid the wages he had earned up to that time.

The court held that his discharge was wrongful, and that he was entitled to recover the cost of his passage to the home port, and of maintenance awaiting passage.

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Crisis Closes Free-Ship Market

THE sudden crisis in the relations between the United States and Germany has already had one important result—the closing of the last big free-ship market in the world. President Wilson, on Feb. 5, issued a proclamation forbidding the sale, lease or charter of any American vessel to any person who is not an American citizen, or the transfer of any American vessel to a foreign registry or flag without the approval of the shipping board.

This action is preliminary to the adoption of other measures that probably would follow declaration of war. These measures, it is believed, now would include the requisition of merchant vessels by the government. President Wilson's proclamation will have the effect of conserving the American merchant shipping facilities, and is in line with similar measures adopted by the belligerents and many other neutrals since the European war began. The shutting down on the sales of American vessels removes the last big nation from the open ship markets.

Just how serious is the need of conserving our merchant marine is shown in the article on page 85. Supplementing that information, it is of value to learn that the last report of the bureau of navigation shows that 109 vessels of 136,549 gross tons have been sold since July 1, 1916.

President Wilson's proclamation follows:

"Whereas, congress did by an 'act to establish a United States shipping board for the purpose of encouraging, developing and creating a naval auxiliary and naval reserve and a merchant marine to meet the requirements of the commerce of the United States with its territories and possessions and with foreign countries; to regulate carriers by water engaged in the foreign and interstate commerce of the United States, and for other purposes,' approved Sept. 7, 1916, provide that 'during any national emergency the existence of which is declared by proclamation of the President, no vessel, registered or enrolled and licensed under the laws of the United States shall, without the approval of the board, be sold, leased, or chartered to any person not a citizen of the United States, or transferred to a foreign registry or flag.'

"And whereas, many ship owners of the United States are permitting their ships to pass to alien registers and to foreign trade in which we do not participate and from which they cannot be bought back to serve the needs of our water-borne commerce without the permission of governments of foreign nations;

"Now, therefore, I, Woodrow Wilson, President of the United States of America, acting under and by virtue of the authority conferred in me by said act of congress, do hereby declare and proclaim that I have found that there exists a national emergency arising from the insufficiency of maritime tonnage to carry the products of the farms, forests, mines, and manufacturing industries of the United States to their consumers abroad and within the United States, and I do hereby admonish all citizens of the United States and every person to abstain from every violation of the provisions of said act of congress, and I do hereby warn them that all violations of such provisions will be rigorously prosecuted, and I do hereby enjoin upon all officers of the United States charged with the execution of the laws thereof the utmost diligence in preventing violation of said act and this my proclamation issued thereunder, and in bringing to trial and punishment any offenders against the same."

Effect Upon Vessels Now Building

It is not believed that this action will prevent American ship yards completing those vessels which are being built under contract for foreign account. It is understood that the legality of stopping the sale of a vessel in the stocks has been discussed at some length by the shipping board, and it is not determined that such work can be prevented from being turned over to the foreigners who had contracted therefor. The law merely prevents the sale of any American ship to foreigners, which ship is now in commission, after it has been registered and enrolled under U. S. registry.

Lake Interests Ready to Help President

THE ship builders and ship owners of the Great Lakes stand ready to place their full resources back of the President in any emergency that may develop in our relations with Germany. The ships which are owned and operated on the Great Lakes are 33 per cent of the entire American merchant marine. According to the latest returns, the ship builders of the Great Lakes are building 165,000 gross tons of steel merchant vessels. These figures furnish an accurate index to the assistance which the Great Lakes interests can give.

In case of emergency, possibly the greatest assistance that they could give, would be to equal or, if possible, excel, the marvelous record set last year in moving freight. This freight is of vital necessity to the United States in times of peace, and ever more vital in times of war. The demand for iron and steel products from both the allies and the United States would be enormous. To meet this demand, it would be imperative that iron ore in immense tonnages be transported from the Lake Superior fields. Grain is and would be vital to the allies, while coal, which moves in the opposite direction, would be vital in keeping the industries of the north and northwest operating at the maximum.

The Great Lakes yards can turn out ocean-going vessels of about 2,100 gross tons in large numbers. These vessels would be of great benefit, not only in serving as auxiliaries to the navy but in expanding our merchant marine and in replacing our war losses in merchant tonnage.

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On the Coasts, Lakes and Rivers

What's Doing and Who's Doing It

Winter Work Being Rushed at Lake Ports

By A. A. Eiben

IN a recent decision by Judge Geiger, of the United States district court at Milwaukee, the steamer CHRISTOPHER was held at fault for the loss of the wooden steamer TOPEKA on Aug. 15, 1916. These vessels were in collision on the Canadian side in the Detroit river near Mullen's coal dock. TOPEKA sank to the bottom. As the wreck was an obstruction to navigation, the Lake Shore Stone Co., Milwaukee, owner of TOPEKA, was obliged to remove the hull. A damage suit for $150,000 was filed by the Lake Shore Stone Co. against the Christopher Steamship Co., owner of CHRISTOPHER. It is reported that a commissioner will be appointed by Judge Geiger to fix the amount of damages to be paid.

* * *

John Marron, Cleveland, agent for the Great Lakes Transit Corporation, died at his home in Cleveland recently after a brief illness. Mr. Marron was formerly a member of the firm of Farasey & Marron, steamboat agents, and later agent for the Anchor line. When the Great Lakes Transit Corporation was formed in 1916, Mr. Marron was appointed Cleveland agent.

* * *

Ice conditions at Buffalo early in February made it difficult for tugs to shift vessels to and from the grain elevators. Owing to the increased demand for export grain, tugs have been struggling during the severe weather to shift vessels with as little delay as possible. There is still a large amount of storage grain at that port to be unloaded before April 1.

* * *

James Falconer, chief engineer of the steamer WILLIAM LIVINGSTONE, of the Richardson fleet, died at his home in Cleveland, Feb. 1. Mr. Falconer had been connected with the Richardson fleet for about 20 years. He was 63 years old and is survived by Mrs. Falconer and two sons, Timothy and Ira, who are both engineers in the Richardson fleet.

* * *

The lake steamer MARYLAND, formerly owned by the Milwaukee-Western Steamship Co., which was sold to coast interests last year, foundered Dec. 26, 1916, about 389 miles east of Sandy Hook. She was enroute from Philadelphia to London with a cargo of miscellaneous merchandise. MARYLAND was owned by the New York, Philadelphia & Norfolk Railway Co.

* * *

J. M. Clifford, formerly agent for the Chicago, Milwaukee & St. Paul railroad at its ore dock at Escanaba, Mich., died recently at Green Bay, Wis. Mr. Clifford had been in charge of the Escanaba dock for many years and was well known by lake vessel men and masters.

* * *

Great interest is manifested in the pool tournament for the Sheadle cup which opened Feb. 5. This tournament is open to members of the welfare plan of the Lake Carriers' Association and is being conducted by Richard Harrison, traveling commissioner for the association.

* * *

Extensive plans have been made for the improvement of Lorain harbor next season. The rivers and harbors bill provides $18,000 for the extension of the west breakwater to the shore line, and the city council of Lorain recently appropriated $3,000 for the same purpose. An additional appropriation by the council of $18,000 for the widening and redredging of Black river is pending. The proposed changes include the removal of the B. & O. ore-unloading plant from its present location to a site on made river-front land south of the Nickel Plate railroad bridge, the erection of a new coal unloader by the B. & O. railroad and the straightening of the Black river channel south of the Erie avenue bridge by dredging away the west bank of the stream.

* * *

Lieut. Eben Barker, who has been in charge of the United States coast guard at the Soo for the past two years, has been transferred to San Juan, Porto Rico. He will be succeeded by Lieut. E. S. Eddison, who has been in charge of the cutter ITASCA at San Juan.

* * *

The car ferry MICHIGAN CENTRAL has been sold by the Kelley Island Lime & Transport Co. to Chicago interests. The steamer is now undergoing repairs.

* * *

Capt. Charles B. Galton, master of the steamer WILLIAM C. AGNEW, will bring out the new 600-foot freighter building for the Buffalo Steamship Co. This steamer will be launched in March.

* * *

Capt. John Babbitt, Lorain, master of the steamer WILLIAM LIVINGSTONE, has been appointed shore captain of the Richardson fleet. Captain Babbitt is well known as a successful navigator, and has been in command of vessels of the Richardson fleet for a number of years.

* * *

Murray M. Duncan, general manager of the Cleveland-Cliffs Iron Co., has been elected vice president of that company, to succeed the late Jasper H. Sheadle. Mr. Duncan will retain the duties of general manager, with offices at Marquette.

* * *

John C. Fitzpatrick, formerly a Cleveland vessel owner, who was associated with Capt. John Mitchell, died recently at Chicago. He was 68 years old.

* * *

William L. Leng, Sheboygan, Wis., fleet engineer for the North American Steamship Co., died suddenly of pneumonia at Cleveland on Feb. 5. Mr. Leng was chief engineer on the steamer JOHN P. REISS during 1916.

* * *

O. C. Tyson, for many years shipyard foreman at the Lorain plant of the American Ship Building Co., has been appointed chief electrician to succeed A. B. Walton, who recently resigned.

* * *

The steamer PONTIAC, of the Cleveland-Cliffs Iron Co.'s fleet, and the steamer REPUBLIC, owned by the Republic Iron Co., M. A. Hanna & Co., managers, have been taken over by the Crescent Transit Co. and will be operated by W. C. Richardson & Co. during 1917. These vessels have been engaged in the ore trade on the Great Lakes more than 25 years, and have a combined carrying capacity of approximately 8,000 gross tons.

On the Chesapeake

By Hollis F. Bennett

The Spedden Ship Building Co. has about completed alterations to the seagoing tug DOROTHY F. WACKER. She was formerly the menhaden fishing tug of the same name. The same company launched the tug GYPSUM PRINCE for the J. B. King Transportation Co., New York. GYPSUM PRINCE broke loose from her launching ways and prematurely launched herself. No one was injured.

* * *

The American-Hawaiian Steamship IOWAN made an 18-day record run from Rio de Janeiro to Baltimore.

* * *

Capt. W. J. Quillen and others of Bethel, Del., have purchased the stranded wreck of the American four-masted schooner MASSASOIT. She lies on the beach, just north of Cape Charles, Va. The new owners will float and rebuild the vessel.

* * *

There are 10 wooden vessels under construction in Baltimore and 14 on the Chesapeake bay. The work is divided as follows: Coastwise Ship Build-

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ing Co., Baltimore, 10; Charles Rhode & Sons Co., Baltimore, two; M. M. Mitchell, Davis & Son, Solomons, Md., nine; Sharptown Marine Railway Co., Sharptown, Md., one; Southern Transportation Co., Chesapeake City, Md., one; E. James Tull & Co., Pocomoke City, Md., one.

* * *

James K. Davie, formerly connected with the Baltimore Dry Docks & Ship Building Co., has been appointed manager of the new plant of the Southern Transportation Co., at Norfolk, Va.

* * *

The Merchants & Miners Transportation Co.'s steamship GLOUCESTER has resumed her place on the Boston line after having new boilers installed by the New York Ship Building Co.

* * *

The former Baltimore schooner EDWARD G. HIGHT, previously reported ashore near Belfast, Ireland, has been floated, but is in a leaky condition.

New Line to Puget Sound

By F. K. Haskell

HERALDING the coming of the Norway-Pacific line as one of the most important events in the history of Seattle, shipping men and officials of ship building corporations joined recently with the commercial organization of that city aboard the motorship GEORGE WASHINGTON at anchor in Elliott bay. During the banquet the Norwegian financial interests were praised and toasted for establishing service by over-sea carriers between Scandinavian ports and the North Pacific. GEORGE WASHINGTON, a triumph in ship building and a vessel of large tonnage, is inaugurating the service of the Norway-Pacific line between Seattle and the ports in Europe. She is the first of a fleet of six motorships which are to be operated regularly on the route.

* * *

Closing a successful career of 24 years in the steamship business, A. N. Floyd, Seattle, general agent of the freight traffic department of the Pacific Steamship Co., has resigned to become associated with the Nooksack Packing Co., Portland, Ore.

* * *

With the hull of one five-mast schooner in full frame and another two-thirds framed, the Olympia Shipbuilding Co. will launch its first vessel early in March. This company now has contracts for four vessels of the same type. They will measure 290 feet over all with 48-foot beam, 27-foot molded depth and 3,500-ton carrying capacity. They are rated as the largest wooden vessels ever built on Puget sound. Although depending largely on sail, the schooners will be equipped with 750-horsepower gasoline engines.

* * *

Olympia activity in ship building is further increased by work on the 12-acre site of the Sloan Shipbuilding Corporation in the capital city. The Sloan company will construct eight slips and commence work shortly on four ocean-going wooden-hull motorships. The company will employ 600 men.

* * *

The steam yacht CYPRUS, built in Seattle and formerly owned by Col. D. C. Jackling, has been sold to the Russian government for $650,000. She will be turned into a scout cruiser. She was built by the Seattle Construction & Dry Dock Co. in 1913.

* * *

Active work will commence shortly on the new pier for the Canadian Pacific railroad at Vancouver, B. C. The pier will be 680 feet longer than the present one. The estimated cost of construction is $750,000. When completed, the new pier will be used by the transpacific as well as by the coast boats.

* * *

Bearing the house flag of the Pacific Steamship Co., under the name of ADMIRAL WAINWRIGHT, the former GRACE DOLLAR arrived in Tacoma recently. GRACE DOLLAR was recently purchased by the Pacific Steamship Co., which has announced that she will be operated in Alaskan service from Puget sound.

* * *

After an absence of several months during which she was operated between the Orient and San Francisco, the well-known liner SEATTLE MARU of the Osaka Shosen Kaisha line has returned to the Tacoma service. The vessel will be withdrawn after two more trips from Tacoma to the Orient and will be replaced by one of the new liners now building in Japan.

Boston Bay Notes

By George S. Hudson

Boston is importing immense quantities of wool and hides from Argentina. In one week, 21,000 bales of wool from Buenos Aires, valued at approximately $8,000,000, were discharged. The consignments were brought in five steamships.

* * *

J. H. Smith, inward freight manager for Patterson, Wylde & Co., Boston, recently was tendered a banquet in recognition of his 25 years of service with the company. A loving cup was presented to Mr. Smith.

* * *

Coal barge HARVARD has been converted into a bark. The work was done by R. T. Green Co., Chelsea, Mass., who sold the rerigged vessel to Federal Transportation Co., New York, for $125,000. HARVARD was built in Brunswick, Me., in 1888. She will load 2,300 tons of phosphate at Houston, Tex., for Rotterdam at $40 per ton. Capt. Neil Olsen is master.

* * *

Schooner JESSIE COSTA, winner of the Lipton cup for fishermen, is given up as lost on passage from Boston to St. John's, N. F. The vessel was owned by D. W. Simpson, Boston, and commanded by Capt. Allen Doleman, of that city.

* * *

Heavy shipments of jute from Calcutta have arrived at Boston in specially chartered ships of the Clan line. These cargoes represent a value of $1,000,000 each.

* * *

Steamer BAY PORT was blown up in Cape Cod canal, where she sank loaded with coal. BAY PORT was owned by White Oak Transportation Co. and was built on the Great Lakes.

* * *

During last year 47,000 horses, consigned to French and British governments, were shipped from Boston to England. Shipments for 1915 were 51,000.

* * *

W. H. Eaves has been appointed Boston representative of Compagnie Transatlantique Generale, with offices at 10 Congress street.

* * *

A new service between South America and Boston has been instituted by the American Transatlantic Co. The first sailing was the steamship MANITOWOC, which will be followed by ALLAGUASH and three others.

* * *

R. T. Green Co., Chelsea, Mass., has sold the new barkentine HERDIS to the Herdis Sailing Ship Co. The vessel, commanded by Capt. Hans Arentz, will load 9,000 barrels of petroleum at New York for Norway. HERDIS is 200 feet long and has a carrying capacity of 2,000 tons.

The Mississippi Delta

By H. H. Dunn

The St. Louis-New Orleans Navigation Co., recently organized in St. Louis, will inaugurate regular passenger and freight service between Missouri and Louisiana ports as soon as the river is cleared of ice. Modern packets, equipped with suitable passenger accommodations are to be used. Steamboat passenger traffic from St. Louis south lost popularity about 20 years ago. The new company has been conducting an extensive publicity campaign to create tourist business for its passenger boats.

* * *

The new river steamer JOHN D. GRACE, built at a cost of $40,000 by the Bradford Transportation Co., Jeffersonville, Ind., reached New Orleans late in January. She will be used in the New Orleans, New Iberia and Bayou Teche freight and passenger service. JOHN D. GRACE is 168 feet long, 38 feet wide and has 4½-foot depth in the shallow hold.

* * *

Reports reaching New Orleans from Santiago de Cuba indicate that the stevedores' strike there is causing serious inconvenience to shipping. Shipping has been tied up for some time. Cargoes are discharged under armed guards.

* * *

The Ollinger & Bruce Dry Dock Co., the Gulf City Dry Docks, and the Alabama Iron Works, all of Mobile, have combined into the Alabama Dry Dock & Ship Building Co. D. R. Dunlap, of the Alabama Iron Works, was named president, and G. H. Dunlap, of the Gulf City Dry Docks, secretary and treasurer.

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Red Hot Tips From the Trade

Pertinent Suggestions and Personal Gossip

THE Schutte & Koerting Co., Philadelphia, has developed an apparatus for producing pure water for drinking and cooking purposes on lake vessels. This system consists of an evaporating and condensing apparatus, steam being taken either directly from the boilers, or by bleeding the low-pressure receiver in reciprocating engines, or by taking auxiliary exhaust steam. The steam is passed through the coils of an evaporator. The drain from the evaporator coils is taken to the hot well and used for boiler feed while the vapor is carried through the vapor pipe to a distilling condenser. Here the vapor is condensed and cooled, the condensate then passing to the filter and aerator and from there draining to the fresh water tank. An evaporator feed water heater, designed to increase the economy of operation, may be placed in the vapor line.

The company states that two pumps should be used in connection with this plant. One pump would take the lake water and pass it through the distilling condenser in order to condense and cool the pure water. The raw water would then be discharged overboard. The ship's injection pump could be used in place of this pump. The second pump would take the water direct from the lake or from the overboard discharge from the condenser, and feed this water to the evaporator. The impure water left in the evaporator would be discharged overboard while that portion of it evaporated was passed to the distilling condenser.

The Schutte & Koerting Co. has made a large number of installations on seagoing vessels. The arrangement of these installations is substantially the same as that outlined. Experts of the company point out that while this arrangement is necessary where sea water is used, it is even more advantageous when using comparatively pure lake water, as the efficiency of operation will be increased and the necessary number of cleanings reduced.

A recent bulletin of the company describes and illustrates in detail the design and operation of the company's evaporating and distilling plant.

Steamer NAHANADA, used on the Kennebec river in connection with Eastern Steamship Corporation service, is being converted into a tug at East Boston to assist in docking company's ships at Boston.

Steel Equipment

A catalog describing a wide variety of steel equipment for use on ships, was issued recently by the Bernstein Mfg. Co., Philadelphia. The company manufactures many different types of berths. One type is adapted for shore and harbor work, or for immigration and detention stations. Stanchions of 2-inch steel tubing are fitted with deck flanges and with adjustable flanges at the top. The berth frame and lee rail are steel tubing, chilled-jointed construction. The berths hinge on flat-head steel pins chilled onto the frame which rests in the brackets on the stanchions. The berths are supported at each end by a heavy chain, which is riveted to the frame and attaches to hook brackets on stanchions. The berth is finished in aluminum bronze. Among the other equipment described are folding and stationary steerage and crew, and stateroom berths; staterooms and double deck beds, steel lockers, chiffoniers, tables, chairs and cabinets.

Develops New Engines

During the past year, the New London Ship & Engine Co., Groton, Conn., has developed two new types of engines. One is a 4-cycle direct reversing type, of which the first pair to be completed were 8-cylinder, 600-horsepower units. The other is a 4-cycle, double-acting type, of which a single-cylinder, 200-horsepower experimental unit of marine type has been run in the shop for the past nine months. This type is to be built in 4 and 6-cylinder models, and up to 500-horsepower to the cylinder. All engines which this company is now building are of the 4-cycle type.

The plant at Groton has been enlarged greatly, but even with the increased capacity it is running 24 hours a day in all departments, and the company is booked to capacity for all of 1917. Efforts are being made to arrange for additional capacity to handle additional orders for engines for both naval and commercial vessels.

Among the many installations made by the New London company during 1916, exclusive of those used for power plants in submarines for the United States and foreign governments, the following may serve to show the kind of service for which these engines are employed:

W. C. T. U., built at Friendship, Me., is a 101 x 16½ x 7-foot, 65-gross ton fishing schooner; 120-horsepower, 4-cycle, reversing gear type.

POWELL, built at Westlake, La., 105 x 27 x 9-foot, cargo schooner; two 60-horsepower, 4-cycle, reversing gear type.

LUCIA, built at Gloucester, Mass., 99½ x 26 x 7½-foot, fishing schooner, 95 gross tons, 43 net tons; 120-horsepower, 4-cycle, reversing gear type.

BETTINA, built at Gloucester, Mass., 108½ x 22 x 8-foot, fishing schooner; 120-horsepower, 4-cycle, reversing gear type.

ASPINET, built at Chelsea, Mass., 102-foot fishing schooner, 126 gross tons, 83 net tons; 120-horsepower, 4-cycle, reversing gear type.

ALYCON, built at Guadeloupe, F. W. I., passenger and freight vessel; 120-horsepower, 4-cycle, reversing gear type.

NELSECO II, built at Boothbay, Me., 123 x 26¼-foot ferry, 140 gross tons; 240-horsepower, 8-cylinder, 4-cycle, reversing gear type.

ESPANA, built at San Juan, P. R., 150 x 25 x 12-foot cargo vessel, 400 gross tons; 240-horsepower, 4-cylinder, 4-cycle, reversing gear type.

Two water and supply boats for the Panama canal, built on the isthmus, 85 x 20 x 7 feet, 185 gross tons, each equipped with 120-horsepower, 4-cycle, reversing gear type.

Catalog on Injectors

A new catalog has just been issued by the Penberthy Injector Co., Detroit, Mich. It contains a large amount of data not only on injectors, but in connection with all jet apparatus and shows a complete line of brass specialties pertaining to the steam, plumbing and automobile accessory trades. A copy will be sent on application.

Oil Burning System

A 56-page bulletin, recently issued by the White Fuel Oil Engineering Corporation, New York, contains a comprehensive description of fuel oil apparatus and its adaptability for use in the marine field. A number of photographs of ships equipped with the company's fuel oil burning system, are reproduced. The principle of construction of the burner is simple. The burner is designed to atomize the oil, previously heated to the point of fluidity, by driving it along grooves on a conical surface from which it is discharged with considerable velocity upon a finer angled cone, issuing through a nozzle or tip as a finely divided spray at a pressure of 60 pounds. The company has developed both duplex and simplex unit systems. These equipments are made in sizes from 200 to 2,000 horsepower.

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Equipment Used Afloat and Ashore

Descriptions of Two Types of Water-Purifying Apparatus

A STILL adapted for purifying the water used for drinking and cooking purposes on lake steamers has been developed by the Standard Water Systems Co., Hampton, N. J. This still has a capacity of about 750 gallons, sufficient, it is estimated, not only to take care of the requirements of a crew of 25 to 30 men, but to accumulate a reserve.

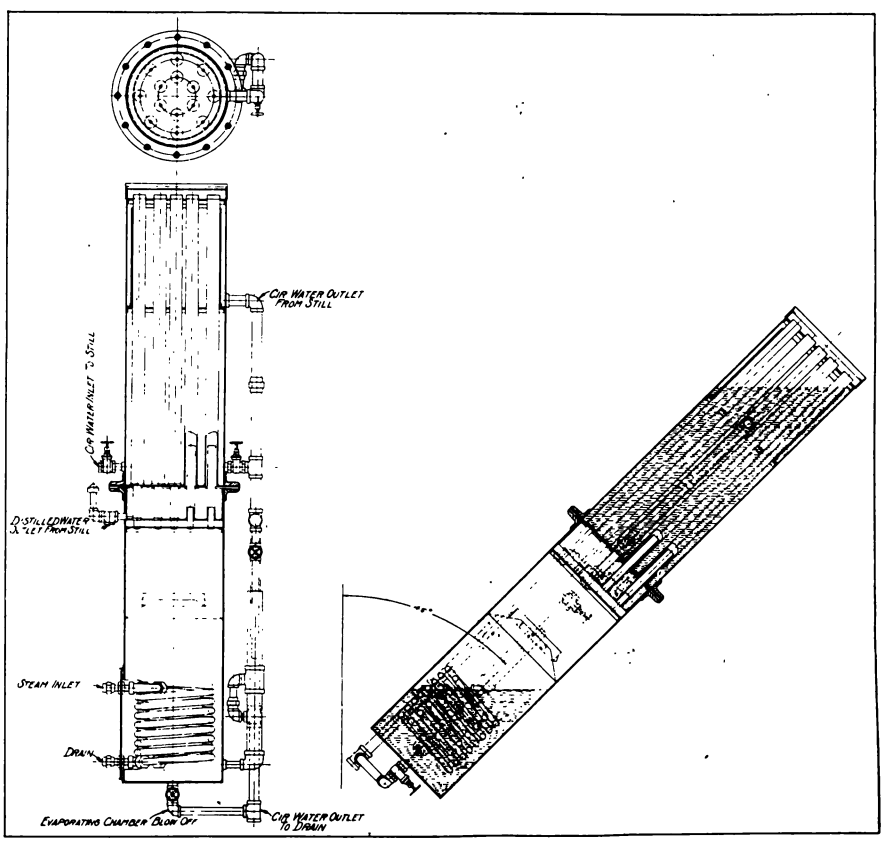
In operation, the raw water enters the still at the inlet shown in the accompanying illustration. The water circulates around condenser tubes inside of which the vapor from the boiling chamber is condensing. The circulating water is raised in temperature to about 190 degrees. At this temperature, it is said that any gases rise to the surface and pass out of the still at the top. The water overflows and is carried down through a pipe to the boiling chamber or evaporator, in which is located a vaporizing coil, which in turn is connected to the steam supply line. The water level in this evaporator is said to be maintained without the use of float valves.

The water fed to the evaporator is vaporized by the steam coil, the vapor passing up through vapor tubes. In passing out at the top of these tubes, a draft of air is induced in adjacent flues. This air is led in over hot plates. The temperature of the vapor and air is said to be the same, so that in mixing complete aeration is accomplished, while any remaining gases pass out at the top of the tubes. The mixture of vapor and heated air condenses against the cool surfaces of the condenser tubes and runs down the tubes into a distilled water reservoir. It is then conducted to the heat exchange or cooler where it circulates through an inner pipe while the raw water is being led through the outer surrounding pipe on its way to the inlet to the still. By this arrangement, the distillate is cooled and the raw water heated.

Six years ago, when adapting its still for marine service, the company made the following changes in its machine in order to give the following special features: The boiling chamber was increased in height so as to increase the vapor space and lessen the chances of priming, due to the rolling of the ship; the air jets were also increased in height to prevent the distilled water from running over the top of them and thence back into the boiling chamber should the vessel at any time take a list of 45 degrees; the condenser tubes were shortened to decrease the over-all height, but the cooling surface is said to be still in excess of that generally obtained in a 500-gallon machine; an overflow compartment was arranged near the top of the condenser chamber. This compartment is designed to permit the circulating water outlet connection to be so lowered that when the still is tipped to an angle of 45 degrees, the circulating water will be carried away through the overflow pipe and not be permitted to overflow the outside of the still. Thus raw water is said to be prevented from entering the condenser tube. For lake service, the height of the still is reduced to meet the limits of headroom, but, by adding additional tubes, the amount of condensing surface has been slightly increased.

The accompanying illustration also shows the levels the water in the boiling, distilled water and condenser chambers, would assume, should the vessel take a list of 45 degrees. This section was prepared by the company to illustrate the action of the still under athwartship rolling.

In the company's stills, the evaporator and condenser shells are boiler steel. The condenser tubes are drawn copper lined with block tin. The distilled water chamber, vapor tubes, and aerating flues are cold-rolled copper lined with block tin. The steam coil in the evaporator is drawn couper tubing coated with block tin. Angle iron clips are used to hold the still to the bulkhead, although other means of holding the still in position may be employed. Without water, the still weighs about 600 pounds and when filled with water to the working level, about 1,030 pounds. The heat exchange weighs about 80 pounds.



GENERAL ARRANGEMENT OF STILL FOR LAKE SERVICE

Takes New Agencies

A. McNab, vice president of the McNab Co., Bridgeport, Conn., recently returned from Europe, where he obtained the sole agency for the United States for the products of Brown Bros. & Co., Ltd., Edinburgh, Scotland, manufacturers of the Brown telemotor; J. Stone & Co., Ltd., Deptford, London, manufacturers of Stone-Lloyd hydraulically operated bulkhead doors, hydraulic underline ash expellers, bronze propellers, hydro-extractors, ship windows, side lights, etc.; B. R. Vickers Engineering Co., Ltd., Leeds,

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England, manufacturer of Vickers' patent tail-shaft lubricating appliances; and of Chadburn's Telegraph Co., Ltd., Liverpool, England, manufacturer of Chadburn's ship telegraph.

Throughout 1916 the McNab Co. reports a record business representing the most prosperous year of its history. During the first three months, January, February and March, sales, including the McNab direction indicator, the Willett-Bruce steamship whistle control and the Cascade boiler circulator, equalled the total sales of any previous 12 consecutive months since the incorporation of the company in 1910. During the first six months of 1916, the company's business equalled that of any previous two years combined.

Still for Lake Service

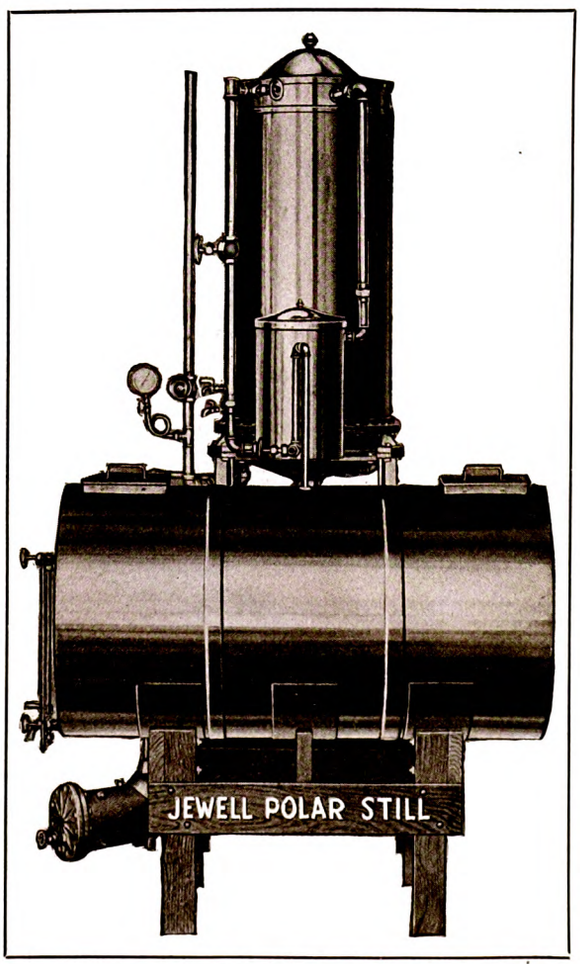
NO LAKE vessel can leave port at the opening of navigation this spring without one of the approved methods of water purification being installed, according to a recent ruling of the bureau of public health service. This ruling has aroused a widespread interest among vessel owners of the Great Lakes and inland rivers in the problem of water purification.

One of the methods of purifying water which has been approved by the government authorities is that of distillation. In this method, the water is subjected to a boiling process and the vapor produced is condensed back to water by coming into contact with cold surfaces. This process leaves the mineral and other impurities of the water deposited in the form of sediment or scale, while the pure water is driven off in the form of vapor.

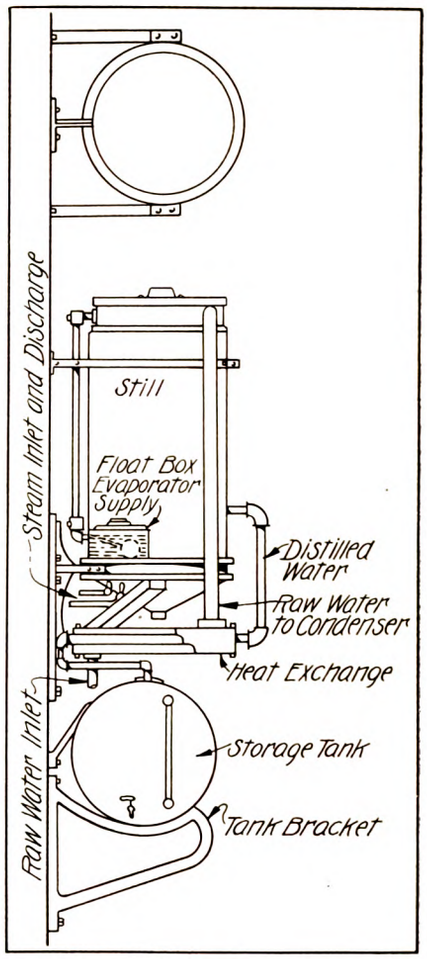
The Jewell Polar Co., Chicago, has given the problem of securing pure water by distillation, careful attention and study for many years. As a result, the company has developed a still which has been in service for some time, particularly for bottling works, and in hospital and laboratory work where the requirements are exacting.

These machines are simple effect stills, which use boiler steam for its heat units only. The condensation is returned to the boiler feed and does not form any part of the distilled water produced by the still.

The general arrangement of the company's marine type still is shown in the accompanying illustration. The still comprises four removable parts, evaporator, condenser, cooler and aerator. The evaporating coil is in the bottom part of the main shell. The condenser is a separate chamber supported within the main shell but separated from the evaporating chamber by a vapor flue and a collecting trough. The condensing surfaces are both water and air cooled. The cooler or heat exchange is located outside of the still proper. Hot distilled water issuing from the still is passed to the cooler where contact with the cold coils, through which the raw water is passing to the condenser, reduces the temperature of the distilled water to within a few degrees of that of the raw water. Water under pressure passing through the aspirator draws into the aerator a constant supply of air which is first washed and purified and then passed into the evaporating chamber to be absorbed by the vapor as it condenses.



STILL WITH STORAGE TANK



STILL ADAPTED FOR SERVICE ON LAKE OR RIVER BOATS

Live steam is supplied to the evaporating coil at the point indicated in the illustration. Raw water is supplied to the still after passing through the cooler coil into the bottom or hottest point of the condensing chamber. The cooling water leaves the condenser at the top, at a temperature of 170 to 185 degrees Fahr. At this temperature the empyreumatic and dissolved gases and odors are said to be driven off through vents in the cover. The cooling water then passes through the float-feed-box into the evaporating chamber. When evaporation lowers the level of water above the evaporating coil, the float in the float-feed-box lowers, taking in a new supply until level is again obtained. The hot water entering the evaporating chamber is vaporized by contact with the steam coil which carries live steam. This vapor rises from the surface through a central vapor flue and in rising carries with it air which has been sterilized. The vapor condenses against cold surfaces. The distillate issues from the still into the cooler and thence into the storage tank. The still is made of heavy galvanized iron. The bottom ring and wall brackets are cast iron.

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